PL202200183

ANDERSON

Storm Water Management Plan

Calculations & Summaries

Gyropolis Addition / Remodel
Bloomington, MN

Project No. 16318

September 28, 2022

I hereby certify that this plan, specification or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

Brian J. Field, P.E. Reg. No. 57224

Prepared By:
Anderson Engineering of MN, LLC
13605 1st Avenue North, Suite 100
Plymouth, MN 55441
Ph: 763.412.4000
Fax: 763.412.4090

Prepared For:
HTG Architects
1010 Mainstreet, Suite 100
Hopkins, MN 55343

ANDERSON
Anderson Engineering of Minnesota, LLC • 13605 1st Avenue North, Suite 100 • Plymouth, Minnesota 55441 • (763) 412-4000 Main • (763) 412-4090 Fax • www.ae-mn.com

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Stormwater Narrative/Summary
Gyropolis Addition
Bloomington, MN

September 28, 2022

Project Overview

The construction of two new addition and the redevelopment of two parcels are proposed for the Gyropolis Restaurant located at 2325 W 90th ST in Bloomington MN. The Owner on the Gyropolis Restaurant has purchased the Lot to the west and is looking to expand the existing building and reconstruct the parking lot. The west parcel has an area of 0.31 acres and the east parcel with an area of 0.43 acres. These two parcels will be platted into one lot with a total area of 0.74 acres.

The project will include the construction of a 685 SF addition to the west elevation of the existing building and a 1,725 SF addition to the east elevation. An outdoor patio area and drive thru lane to the south is proposed as part of the redevelopment, and as such the Owner will obtain an access easement from the neighbor to the south for the drive thru access. Construction is planned to begin in the Spring of 2023 and completed in Summer of 2023.

Existing Site Conditions

The property is bounded by Penn Ave S to the east, 90th ST W to the North and a Burger King to the South. The entire site surface drains to the north and east towards the intersection of Penn and 90th where it is collected in the local storm sewer system at a low point. An existing gas station currently resides on the east parcel and will be demolished as part of the project.

The nearly 31-acre property is bounded by Interstate 94 to the west, CSAH 13 to the east, the FedEx Distribution Building to the north, and the Clam Corporation to the south. Generally, the site surface drains to the north towards the existing wetland onsite with small portions flowing directly to the existing Clam pond and the Brockton Ln N ditch. The existing wetland has an overflow structure near the northeast corner of the site were water exits. Water then follows the Brockton Ln N ditch to the north and eventually discharges into Grass Lake. The existing drainage pattern can be seen in **Exhibit A: Existing Drainage Map** within the appendices of this report.

Site History

Currently, a gas station/convenience store exists on Parcel 9000 or the east parcel. This gas station has been closed since 2008 and is abandoned. This property identified as Premium Stop is listed as a LUST site and was reported in 1990 during the removal and replacement of three USTs on the property. The site was mitigated, and the LUST was closed by the MPCA in 1990. More recently, the remaining USTs were removed in 2011 with no leaking noted. A full Phase I Environmental Site Assessment was completed in 2013 by Landmark Environmental LLC and has been included as part of this submittal. The following documentation has been included as part of the appendix of this report:

- **Exhibit H: LUST Closure Letter**
- **Exhibit I: Tank Removal Letter**

Stormwater Narrative/Summary
Gyropolis Addition
Bloomington, MN

September 28, 2022

Soils

Soil testing for the project is currently pending. Four to six test borings are to be performed on site within the building footprint and within the proposed infiltration BMP. In 1991, EnecoTech Environmental Consultants performed four soil borings near the northeast corner of the site and is in direct proximity to the proposed infiltration BMP. Results indicate that SP sand was found at depths of 5-30+ feet below grade with a water table near 40' in depth. Based off of this information and per the Minnesota Stormwater Manual, a design infiltration rate of 0.80 in/hr is to be used for the SP type soil or Hydraulic soil group 'A'. The four soil boring results can be found within **Exhibit G: Historical Soil Borings** within the appendix of this report.

Proposed Site Conditions

The proposed construction will consist of two additions to the existing building, reconstruction of the existing parking lot, and a new outdoor dining area. For a full set of Civil plans, refer to **Exhibit F** within the appendix of this report.

The proposed drainage pattern will be relatively unchanged. The entire proposed site drains towards the northeast corner of the site and into the city storm network at the intersection of Penn and West 90th. The project is proposing a filtration rock trench (10P) under permeable pavers located in the northeastern corner of the site to meet local rules and regulations. Stormwater will either surface drain to the permeable pavers or will be captured within the local storm sewer system which outlets into the rock filtration trench. Discharge from the filtration rock trench (10P) will be limited by an outlet control structure and concrete weir before leaving the site. The proposed drainage pattern can be seen in **Exhibit B: Proposed Drainage Map** within the appendices of this report.

Methodology

Hydrocad

The Hydrologic characteristics of the site were modeled using HydroCAD software. TR55/TR20 methods were utilized. Existing and proposed drainage areas were determined via review of as-built data, current land survey data, and aerial photos.

The 2, 10, & 100-year frequency events were analyzed for peak runoff rate control in the existing and proposed conditions. The MSE-3 24-hr distribution was used in analysis. Depths for the 2, 10, & 100-year storms were found to be 2.86", 4.26", and 7.32" respectively.

Runoff from pervious and impervious surfaces were calculated separately in order to more accurately model the runoff volume from the site surfaces. Time of Concentrations have been calculated using the HydroCAD program individually for each sub-catchment. Results of this analysis are summarized below, and a report can be seen in **Exhibit C: Hydrocad Report**.

Stormwater Narrative/Summary
Gyropolis Addition
Bloomington, MN

September 28, 2022

Stormwater Conveyance

The storm sewer network was designed based upon the 10-year storm event. The rational method was employed to determine the flowrate into the storm sewer; pipe diameter, inlet elevations, and slopes were designed to accommodate the ten-year flow through the devices. **Exhibit E: Storm Sewer Sizing Worksheet** attached in the Appendix shows the individual calculations for the storm network.

A Manning's Coefficient of 0.013 was assumed, and overflow routes to drain low points along curb and gutter provide a minimum freeboard of 1 foot. All tributary area was considered for calculations.

Nine Mile Creek Watershed District Rules

In addition to the rules described below, the proposed design and report will utilize those definitions and procedural requirements as described in Rule 1.0 of the Nine Mile Creek Watershed District Rules. **Table 1** below summarizes the watershed rules that are **not** applicable to this site:

Table 1: Non-Applicable Watershed Rules	
2.0	Floodplain Alteration
3.0	Wetlands Management
6.0	Waterbody Crossing and Structures
7.0	Shoreline and Streambank Improvements
8.0	Sediment Removal
9.0	Appropriation of Public Surface Waters

Below is a summary of other applicable watershed rules and regulations have been met for this project:

Rule 4.0 – Stormwater Management

This project will disturbed more than 50 percent of the existing impervious surface on site and therefore, the stormwater criteria of section 4.3 applies.

4.3.4.a – Volume Control

Regulation: Provide for the retention onsite of 1.1 inches of runoff from the regulated impervious surface of the site.

Abstraction Req (CF): 0.574 Ac x 43,560 CF / Ac x 1.1 in. x 1 ft / 12 in = **2,292 CF**

Proposed:

The underground rock filtration trench (10P) has been sized to treat the entire abstraction for the site. Pretreatment for the filtration trench will be provided via 2' sump manholes at all inlet locations. Parameters for 10P include a surface area of 1994 SF, a depth ranging 4.0' to 5.4', and a void ration of 40% of the storage rock.

The release of stormwater from the rock trench will be controls through a concrete weir within OCS-1, set at an elevation of 830.40. Per **Exhibit C: Hydrocad Report**, the cumulative volume below the concrete weir is **2,313 CF**.

The filtration trench (10P) has been sized to allow a drawdown time of less than 48 hours. By using a design filtration rate of 0.80 in/hr, the trech surface area, and volume below the lowest outlet, the drawdown time has been calculated as follows:

Drawdown Time (HR) = V/vA(1/12) = 2313/(0.8x1994)(1/12) = **17.39 HR**

4.3.1.b – Rate Control

Regulation: Limit Peak runoff flow rates to that form existing conditions for the 2, 10, and 100-year frequency storm events for all collection points where stormwater discharge leaves the site.

Proposed:

Rate control was analyzed for the 2, 10, and 100-year storm event. Existing condition rates and proposed rated were compared for the entire property area and at individual discharge points on the site. Runoff rates for the proposed activity shall not exceed existing runoff rates for the 2, 10, and 100-year critical storm.

A full summary of the existing and proposed HydroCAD results can be found within **Exhibit C: Hydrocad Report** in the appendices of this report. Tabulations of the existing and proposed peak runoff rates can be found in **Table 2** shows that post development rates are held below existing conditions:

Table 2: Rate Control Summary			
Storm Event	1R – Existing (CFS)	10R - Proposed	10P – HWL
2-year	2.77	0.38	830.48
10-year	4.35	3.31	830.74
100-year	7.73	6.08	831.12

4.3.1.c – Water Quality

Regulation: Provide for at least 60 percent annual removal efficiency for total phosphorus and at least 90 percent annual removal efficiency for total suspended solids from site runoff.

Proposed:

The proposed site met the pollution load reduction requirement through the filtration practices provided by the permeable pavement / rock filtration trench. The proposed conditions were modeled using the MIDS Calculator (version 4). A full summer of the results can be found in **Exhibit D: MIDS Results** and a tubulation of proposed pollutant loads can be found in **Table 3** below:

Table 3: MIDS Calculator Summary		
Pollutant	Removal Efficiency (%)	Annual Runoff Load (lbs)
TSS	92	16.6
Total Phosphorus	92	0.0918

4.3.3 – Low-floor Elevation

Regulation: Reconstructed buildings must be constructed at least two feet above the 100-year high water elevation or one foot above the natural overflow of a waterbody.

Proposed:

The low floor elevation of the existing building and additions is to be 835.20. The 100-year HWL of 10P is proposed at 831.12.

Rule 5.0 – Erosion and Sediment Control

Anderson Engineering will obtain a permit from the district that incorporates and approves an erosion and sediment control plan for the project before the start of the project. Disturbance will not be greater than 1.0 acre in area and therefore a Stormwater Pollution Prevention Plan (SWPPP) is **not** required for the project. It is the responsibility of the contractor to implement and modify the erosion and sediment control plan as construction proceeds.

Summary

The site layout and final grading is designed to take advantage of the existing terrain for drainage and will result in a gently rolling topography matching the surrounding landscape. Within the project boundary, some changes to the existing drainage patterns are expected due to the proposed structures and other site improvements. The project design does not propose to make major changes to drainage divides.

PL202200183

LEGEND

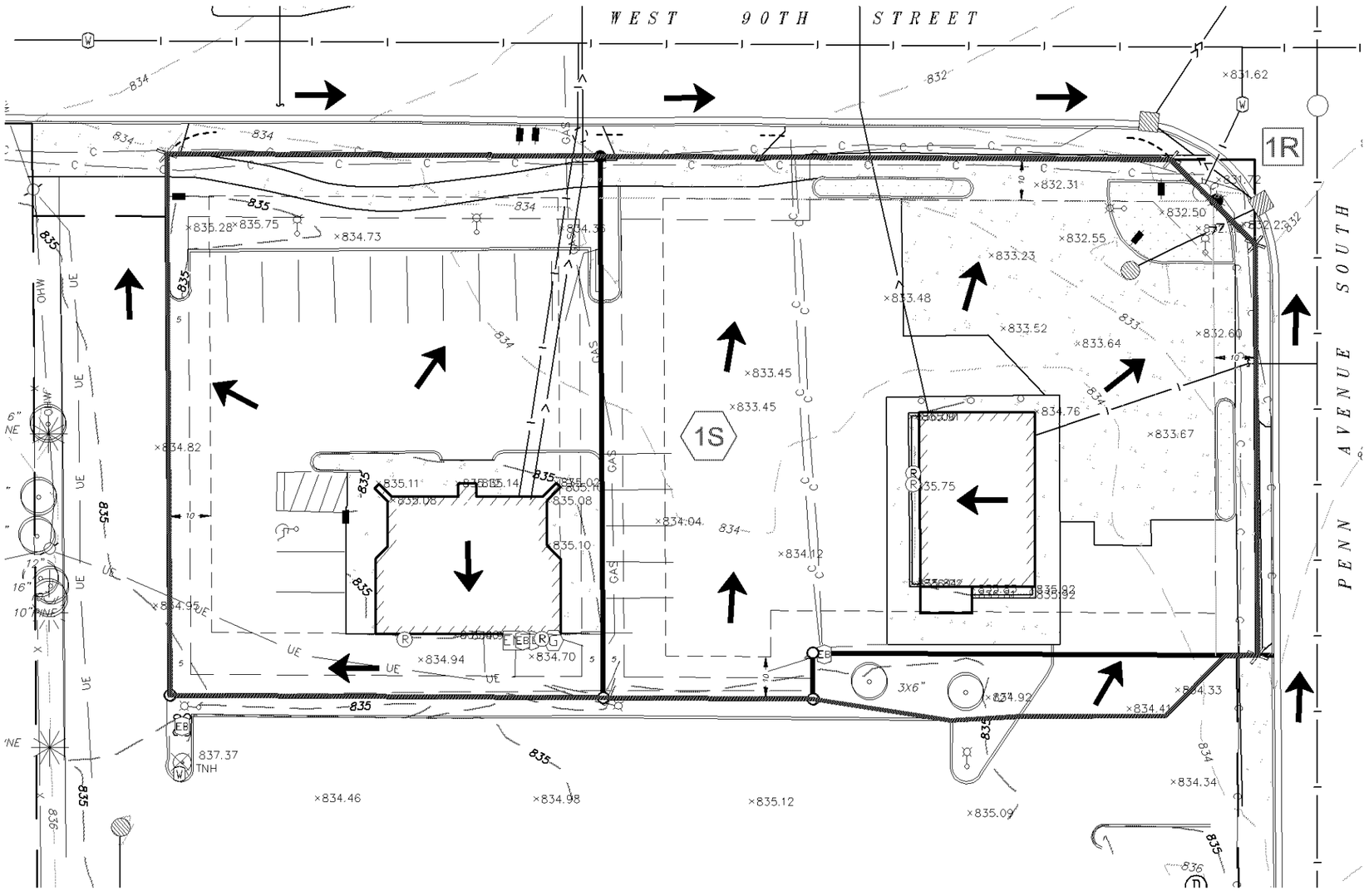
DRAINAGE ARROW DIRECTION

DRAINAGE AREA BOUNDARY

1S SUB-DRAINAGE AREA

N

0 30' 60'



ANDERSON

13605 1st Avenue N. #100
Plymouth, MN 55441 | ae-mn.com
P 763.412.4000 | F 763.412.4090
Anderson Engineering of Minnesota, LLC

GYROPOLIS

ADDITION / REMODELING

2325 W 90TH ST
BLOOMINGTON, MN

REVISION LOG

NO.	DATE	DESCRIPTION

CITY SUBMITTAL
SEPTEMBER 28, 2022

DRAWING TITLE

EXISTING DRAINAGE MAP

DRAWING NO.

A

PLOTTED: 9/27/22

COMM. NO. 16318

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LEGEND

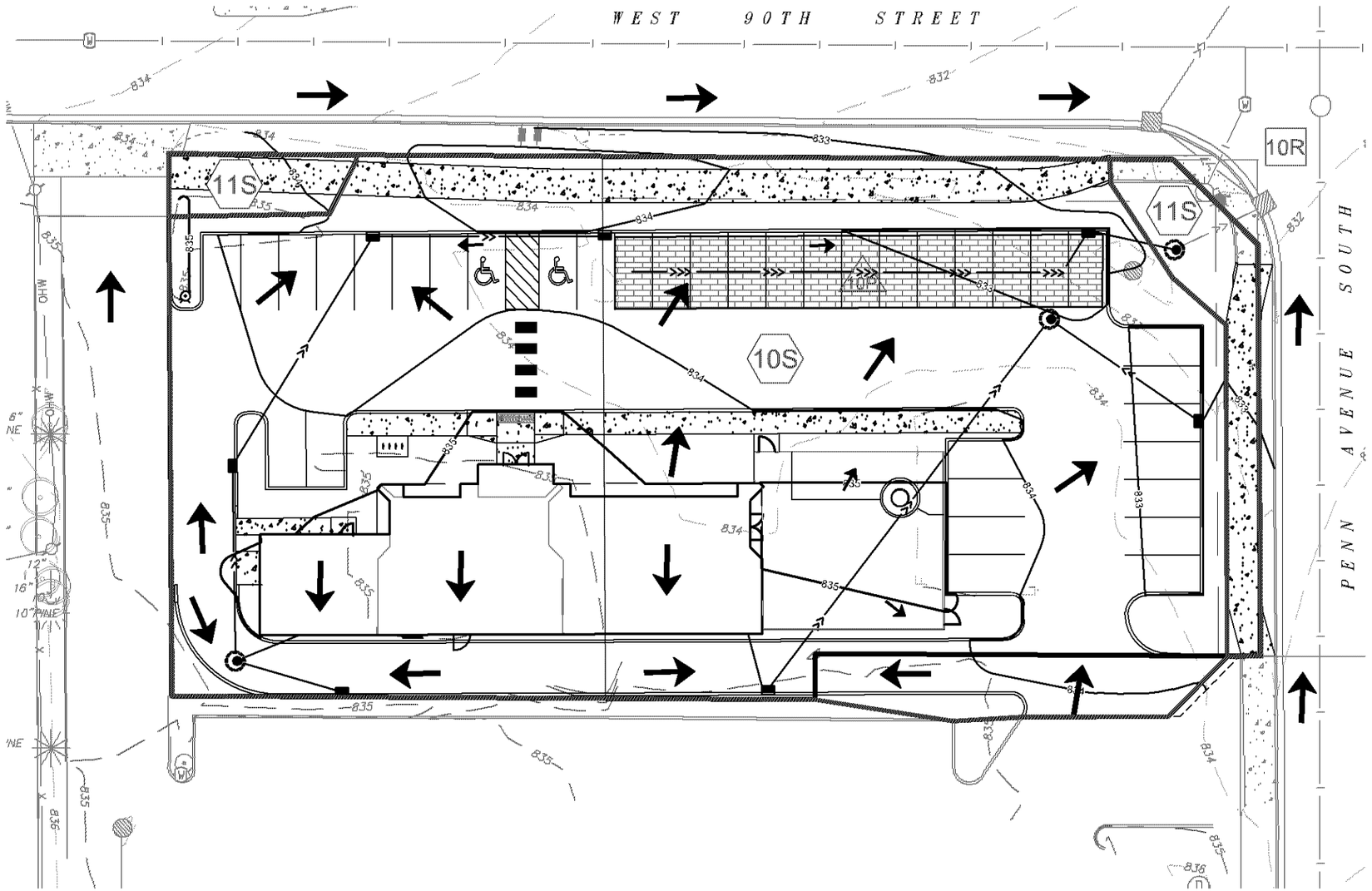
DRAINAGE ARROW DIRECTION

DRAINAGE AREA BOUNDARY

10S SUB-DRAINAGE AREA

N

0 30' 60'



ANDERSON
13605 1st Avenue N. #100
Plymouth, MN 55441 | ae-mn.com
P 763.412.4000 | F 763.412.4090
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GYROPOLIS

ADDITION / REMODELING

2325 W 90TH ST
BLOOMINGTON, MN

REVISION LOG

NO.	DATE	DESCRIPTION

CITY SUBMITTAL
SEPTEMBER 28, 2022

DRAWING TITLE

PROPOSED DRAINAGE MAP

DRAWING NO.

B

PLOTTED: 9/27/22

COMM. NO. 16318

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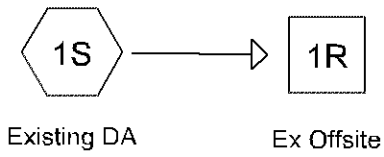
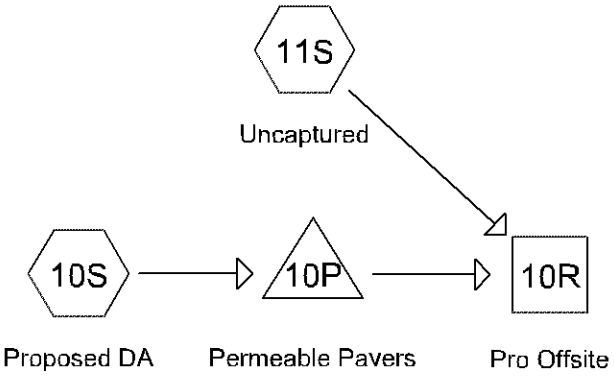
C - HYDROCAD REPORT



Existing Conditions



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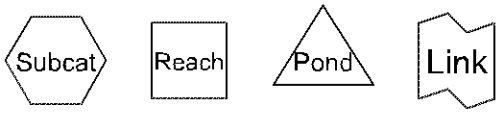
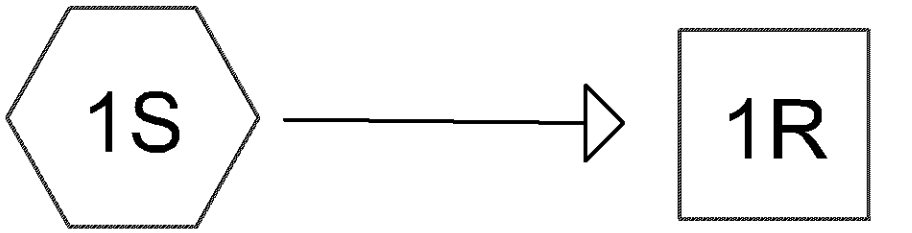


Routing Diagram for 16318_Hydrocad
Prepared by Anderson Engineering of MN, LLC, Printed 9/27/2022
HydroCAD® 10.10-7a s/n 00837 © 2021 HydroCAD Software Solutions LLC



Existing DA

Ex Offsite

Existing Conditions

Subcat Reach Pond Link

Routing Diagram for 16318_Hydrocad
Prepared by Anderson Engineering of MN, LLC, Printed 9/27/2022

Project Notes

Rainfall events imported from "NRCS-Rain.txt" for 5327 MN Hennepin

Rainfall Events Listing

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	2-Year	MSE 24-hr	3	Default	24.00	1	2.86	2
2	10-Year	MSE 24-hr	3	Default	24.00	1	4.26	2
3	100-Year	MSE 24-hr	3	Default	24.00	1	7.32	2

Area Listing (selected nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.058	39	>75% Grass cover, Good, HSG A (1S)
0.708	98	Paved parking, HSG A (1S)
0.766	**94**	**TOTAL AREA**

Soil Listing (selected nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.766	HSG A	1S
0.000	HSG B	
0.000	HSG C	
0.000	HSG D	
0.000	Other	
0.766		**TOTAL AREA**

Ground Covers (selected nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.058	0.000	0.000	0.000	0.000	0.058	>75% Grass cover, Good	1S
0.708	0.000	0.000	0.000	0.000	0.708	Paved parking	1S
0.766	**0.000**	**0.000**	**0.000**	**0.000**	**0.766**	**TOTAL AREA**	

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: Existing DA Runoff Area=0.766 ac 92.43% Impervious Runoff Depth>2.14"
Tc=7.0 min CN=94 Runoff=2.77 cfs 0.137 af

Reach 1R: Ex Offsite Inflow=2.77 cfs 0.137 af
Outflow=2.77 cfs 0.137 af

Total Runoff Area = 0.766 ac Runoff Volume = 0.137 af Average Runoff Depth = 2.14"
7.57% Pervious = 0.058 ac 92.43% Impervious = 0.708 ac

Summary for Subcatchment 1S: Existing DA

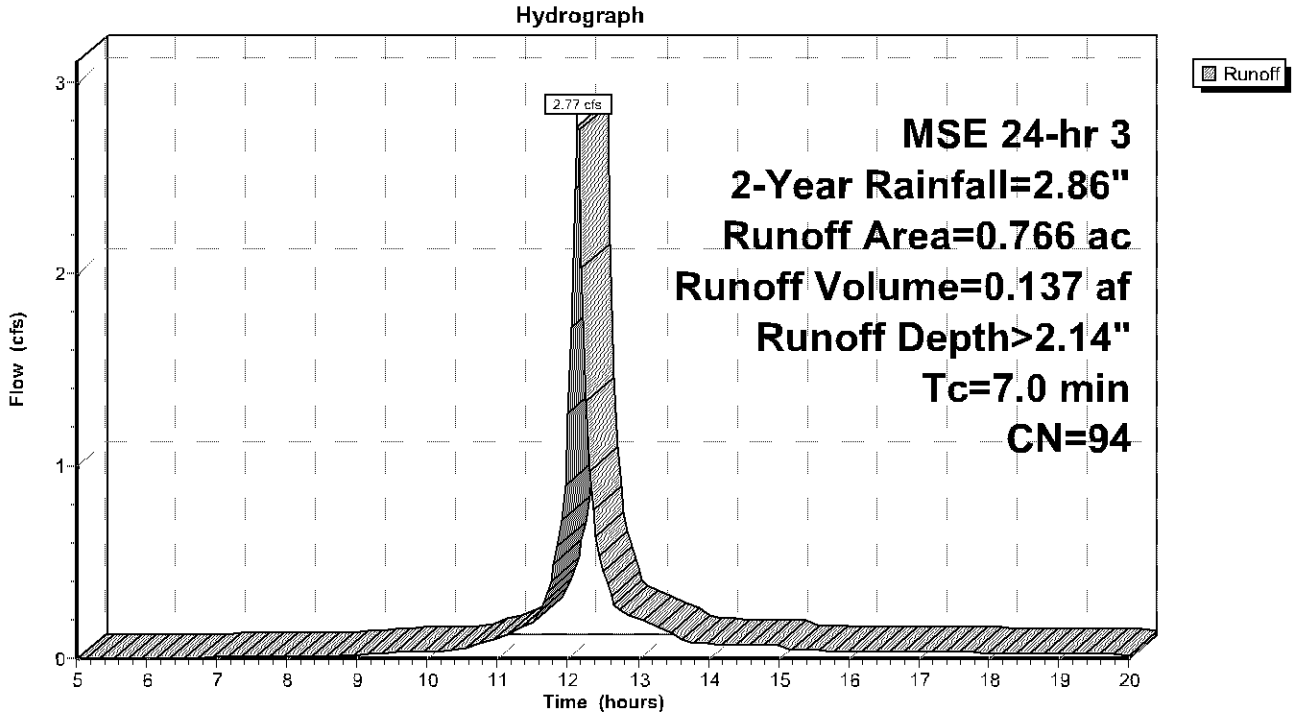
Runoff = 2.77 cfs @ 12.14 hrs, Volume= 0.137 af, Depth> 2.14"
Routed to Reach 1R : Ex Offsite

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 2-Year Rainfall=2.86"

Area (ac)	CN	Description
0.708	98	Paved parking, HSG A
0.058	39	>75% Grass cover, Good, HSG A
0.766	94	Weighted Average
0.058		7.57% Pervious Area
0.708		92.43% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0					**Direct Entry,**

Subcatchment 1S: Existing DA



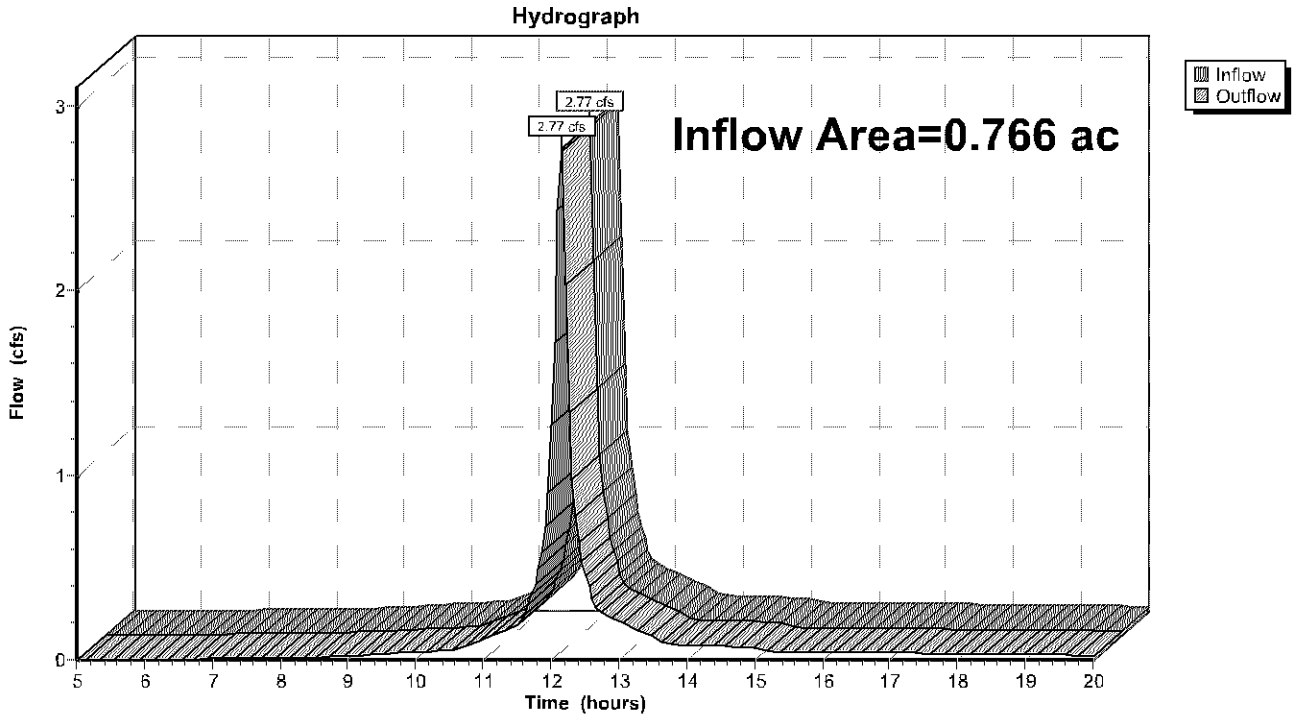
Summary for Reach 1R: Ex Offsite

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 0.766 ac, 92.43% Impervious, Inflow Depth > 2.14" for 2-Year event
Inflow = 2.77 cfs @ 12.14 hrs, Volume= 0.137 af
Outflow = 2.77 cfs @ 12.14 hrs, Volume= 0.137 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Reach 1R: Ex Offsite



Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: Existing DA Runoff Area=0.766 ac 92.43% Impervious Runoff Depth>3.47"
Tc=7.0 min CN=94 Runoff=4.35 cfs 0.221 af

Reach 1R: Ex Offsite Inflow=4.35 cfs 0.221 af
Outflow=4.35 cfs 0.221 af

Total Runoff Area = 0.766 ac Runoff Volume = 0.221 af Average Runoff Depth = 3.47"
7.57% Pervious = 0.058 ac 92.43% Impervious = 0.708 ac

Summary for Subcatchment 1S: Existing DA

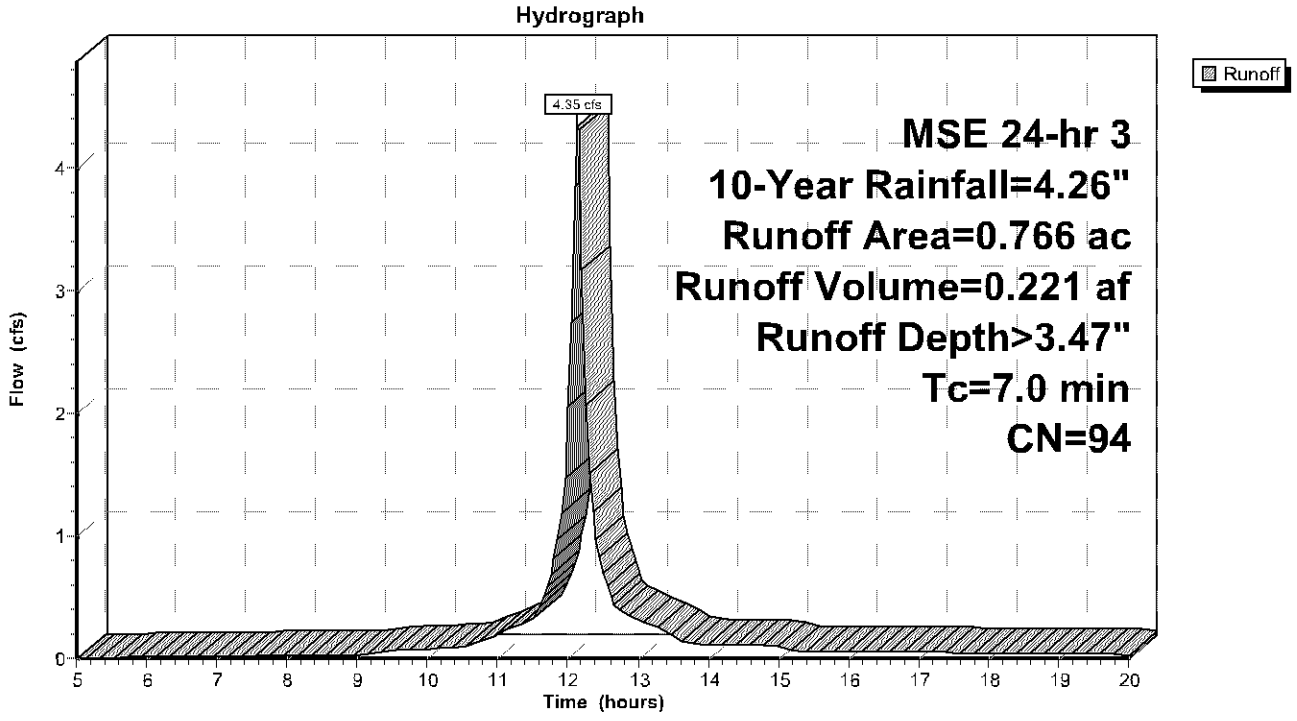
Runoff = 4.35 cfs @ 12.14 hrs, Volume= 0.221 af, Depth> 3.47"
Routed to Reach 1R : Ex Offsite

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 10-Year Rainfall=4.26"

Area (ac)	CN	Description
0.708	98	Paved parking, HSG A
0.058	39	>75% Grass cover, Good, HSG A
0.766	94	Weighted Average
0.058		7.57% Pervious Area
0.708		92.43% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0					**Direct Entry,**

Subcatchment 1S: Existing DA



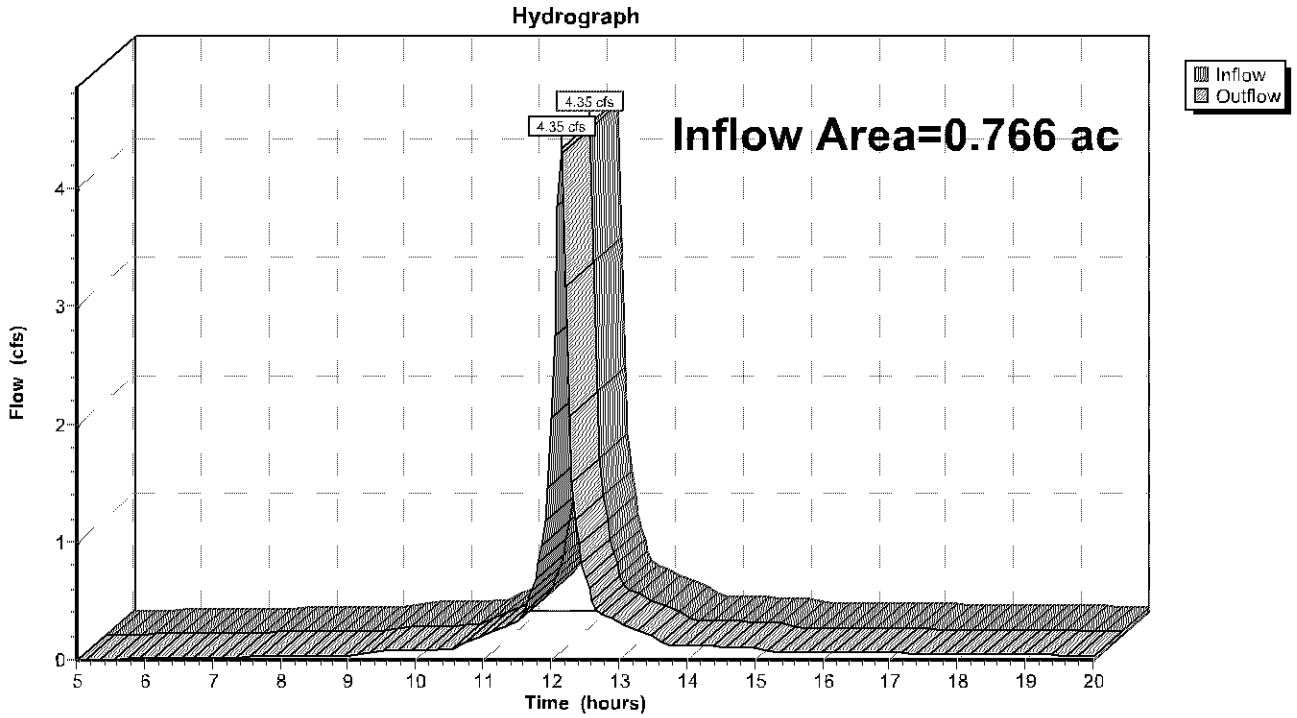
Summary for Reach 1R: Ex Offsite

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 0.766 ac, 92.43% Impervious, Inflow Depth > 3.47" for 10-Year event
Inflow = 4.35 cfs @ 12.14 hrs, Volume= 0.221 af
Outflow = 4.35 cfs @ 12.14 hrs, Volume= 0.221 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Reach 1R: Ex Offsite



Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: Existing DA Runoff Area=0.766 ac 92.43% Impervious Runoff Depth>6.39"
Tc=7.0 min CN=94 Runoff=7.73 cfs 0.408 af

Reach 1R: Ex Offsite Inflow=7.73 cfs 0.408 af
Outflow=7.73 cfs 0.408 af

Total Runoff Area = 0.766 ac Runoff Volume = 0.408 af Average Runoff Depth = 6.39"
7.57% Pervious = 0.058 ac 92.43% Impervious = 0.708 ac

Summary for Subcatchment 1S: Existing DA

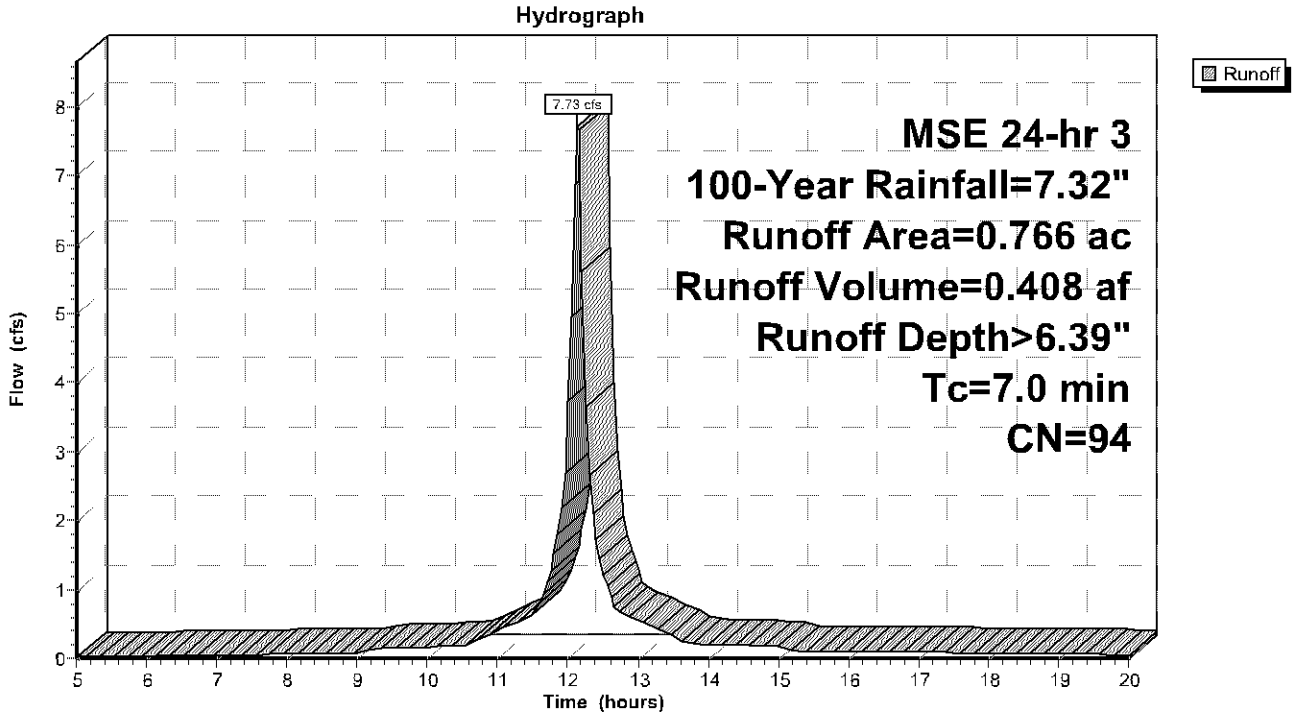
Runoff = 7.73 cfs @ 12.14 hrs, Volume= 0.408 af, Depth> 6.39"
Routed to Reach 1R : Ex Offsite

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100-Year Rainfall=7.32"

Area (ac)	CN	Description
0.708	98	Paved parking, HSG A
0.058	39	>75% Grass cover, Good, HSG A
0.766	94	Weighted Average
0.058		7.57% Pervious Area
0.708		92.43% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0					**Direct Entry,**

Subcatchment 1S: Existing DA



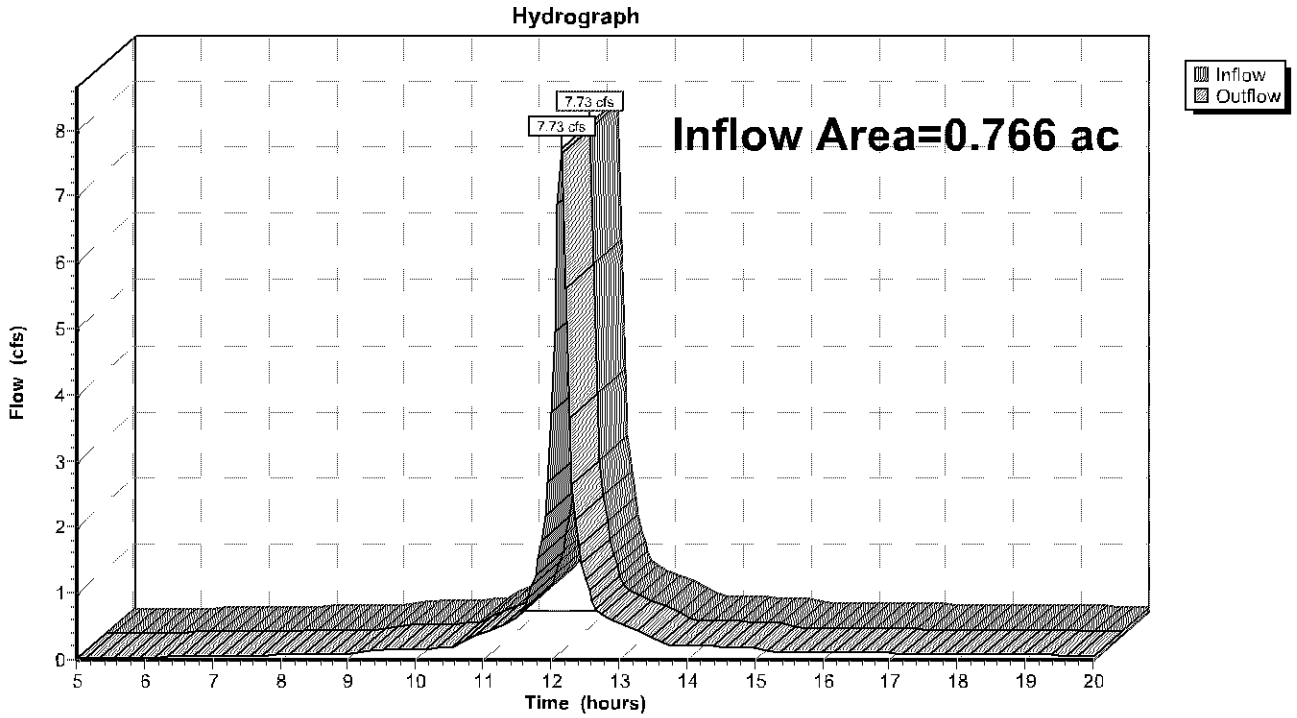
Summary for Reach 1R: Ex Offsite

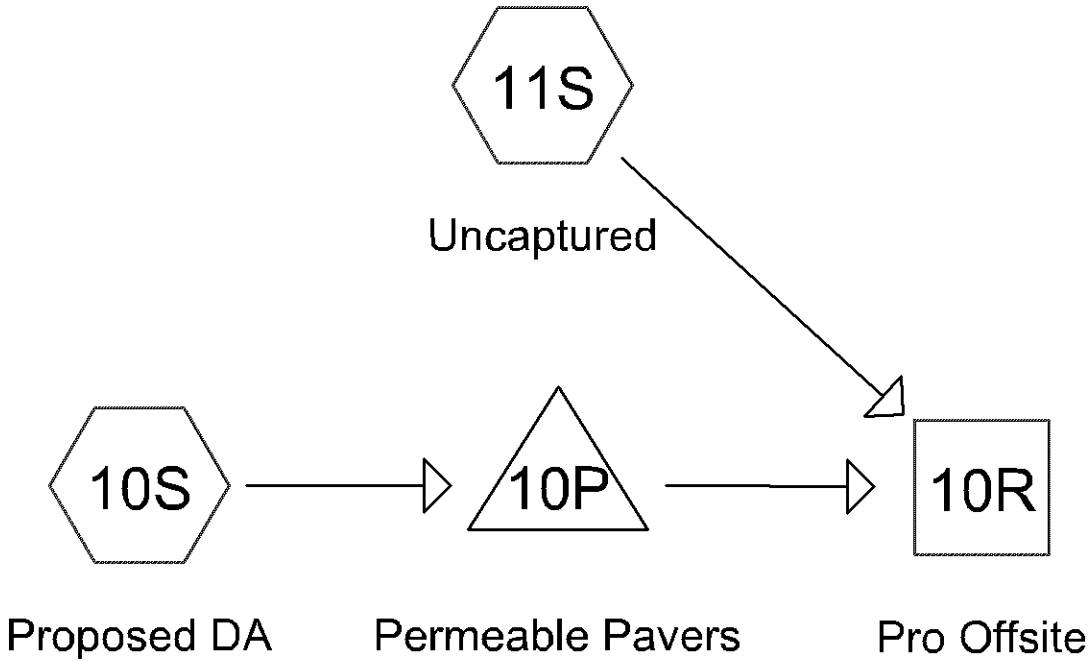
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 0.766 ac, 92.43% Impervious, Inflow Depth > 6.39" for 100-Year event
Inflow = 7.73 cfs @ 12.14 hrs, Volume= 0.408 af
Outflow = 7.73 cfs @ 12.14 hrs, Volume= 0.408 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Reach 1R: Ex Offsite





Proposed Conditions

Subcat Reach Pond Link

Routing Diagram for 16318_Hydrocad
Prepared by Anderson Engineering of MN, LLC, Printed 9/27/2022

Project Notes

Rainfall events imported from "NRCS-Rain.txt" for 5327 MN Hennepin

Rainfall Events Listing

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	2-Year	MSE 24-hr	3	Default	24.00	1	2.86	2
2	10-Year	MSE 24-hr	3	Default	24.00	1	4.26	2
3	100-Year	MSE 24-hr	3	Default	24.00	1	7.32	2

Area Listing (selected nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.146	39	>75% Grass cover, Good, HSG A (10S, 11S)
0.574	98	Paved parking, HSG A (10S, 11S)
0.046	98	Permeable Pavers (10S)
0.766	**87**	**TOTAL AREA**

Soil Listing (selected nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.720	HSG A	10S, 11S
0.000	HSG B	
0.000	HSG C	
0.000	HSG D	
0.046	Other	10S
0.766		**TOTAL AREA**

Ground Covers (selected nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.146	0.000	0.000	0.000	0.000	0.146	>75% Grass cover, Good	10S, 11S
0.574	0.000	0.000	0.000	0.000	0.574	Paved parking	10S, 11S
0.000	0.000	0.000	0.000	0.046	0.046	Permeable Pavers	10S
0.720	**0.000**	**0.000**	**0.000**	**0.046**	**0.766**	**TOTAL AREA**	

Pipe Listing (selected nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Width (inches)	Diam/Height (inches)	Inside-Fill (inches)
1	10P	827.50	827.10	22.0	0.0182	0.013	0.0	12.0	0.0

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment10S: Proposed DA Runoff Area=0.733 ac 82.54% Impervious Runoff Depth>1.63"
Tc=7.0 min CN=88 Runoff=2.14 cfs 0.099 af

Subcatchment11S: Uncaptured Runoff Area=0.033 ac 45.45% Impervious Runoff Depth>0.44"
Tc=7.0 min CN=66 Runoff=0.02 cfs 0.001 af

Reach 10R: Pro Offsite Inflow=0.38 cfs 0.022 af
Outflow=0.38 cfs 0.022 af

Pond 10P: Permeable Pavers Peak Elev=830.48' Storage=2,377 cf Inflow=2.14 cfs 0.099 af
Discarded=0.04 cfs 0.029 af Primary=0.37 cfs 0.020 af Outflow=0.41 cfs 0.050 af

Total Runoff Area = 0.766 ac Runoff Volume = 0.101 af Average Runoff Depth = 1.58"
19.06% Pervious = 0.146 ac 80.94% Impervious = 0.620 ac

Summary for Subcatchment 10S: Proposed DA

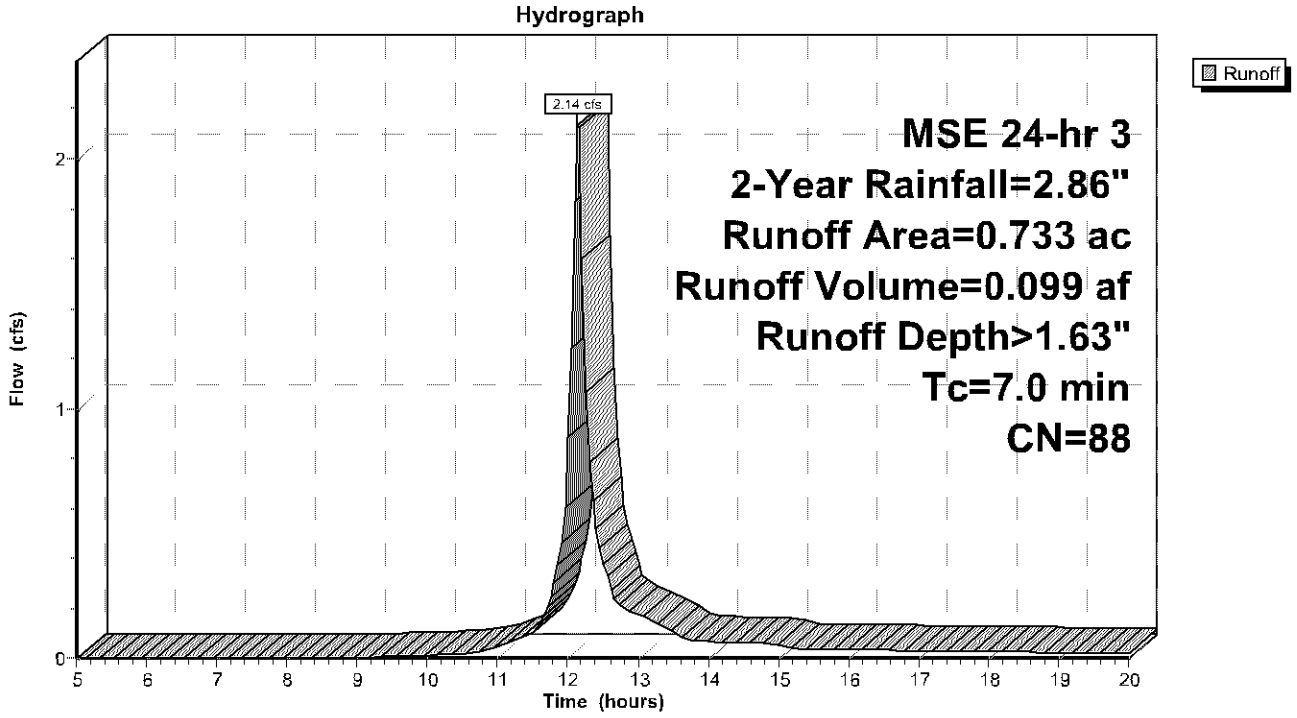
Runoff = 2.14 cfs @ 12.14 hrs, Volume= 0.099 af, Depth> 1.63"
Routed to Pond 10P : Permeable Pavers

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 2-Year Rainfall=2.86"

	Area (ac)	CN	Description
	0.559	98	Paved parking, HSG A
	0.128	39	>75% Grass cover, Good, HSG A
*	0.046	98	Permeable Pavers
	0.733	88	Weighted Average
	0.128		17.46% Pervious Area
	0.605		82.54% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0					**Direct Entry,**

Subcatchment 10S: Proposed DA



Summary for Subcatchment 11S: Uncaptured

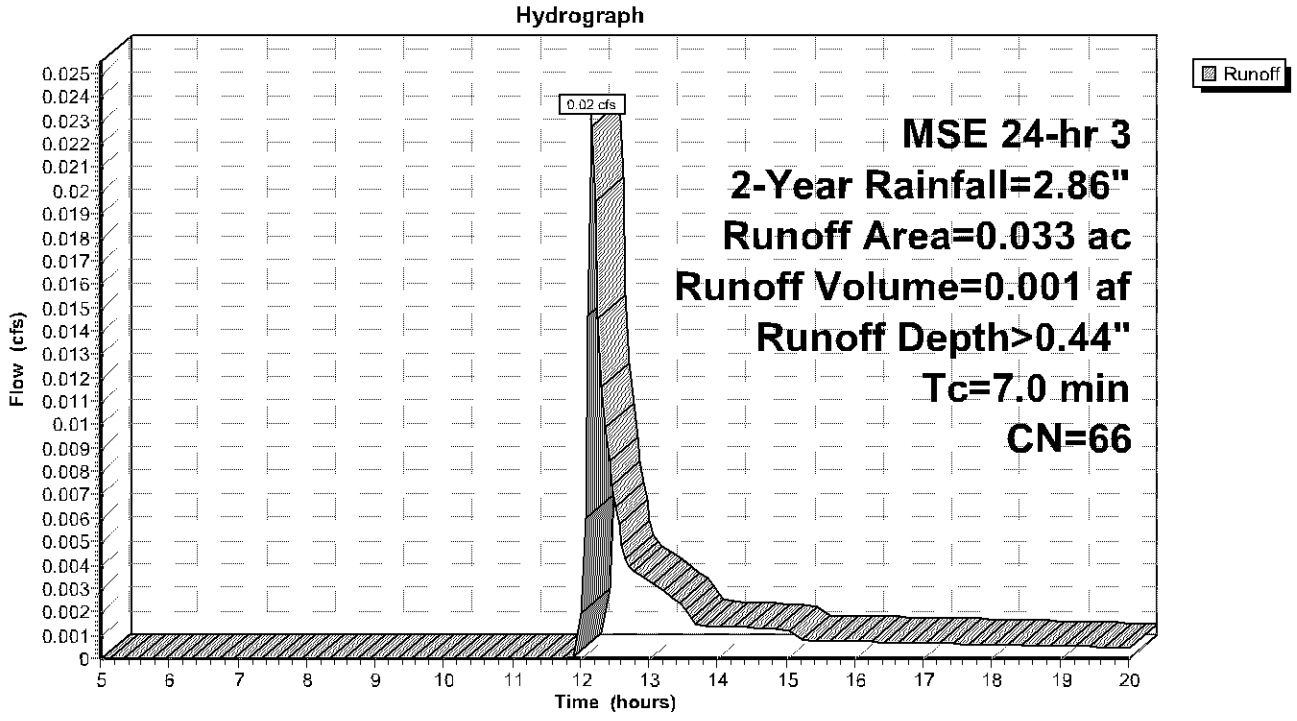
Runoff = 0.02 cfs @ 12.16 hrs, Volume= 0.001 af, Depth> 0.44"
Routed to Reach 10R : Pro Offsite

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 2-Year Rainfall=2.86"

Area (ac)	CN	Description
0.015	98	Paved parking, HSG A
0.018	39	>75% Grass cover, Good, HSG A
0.033	66	Weighted Average
0.018		54.55% Pervious Area
0.015		45.45% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0					**Direct Entry,**

Subcatchment 11S: Uncaptured



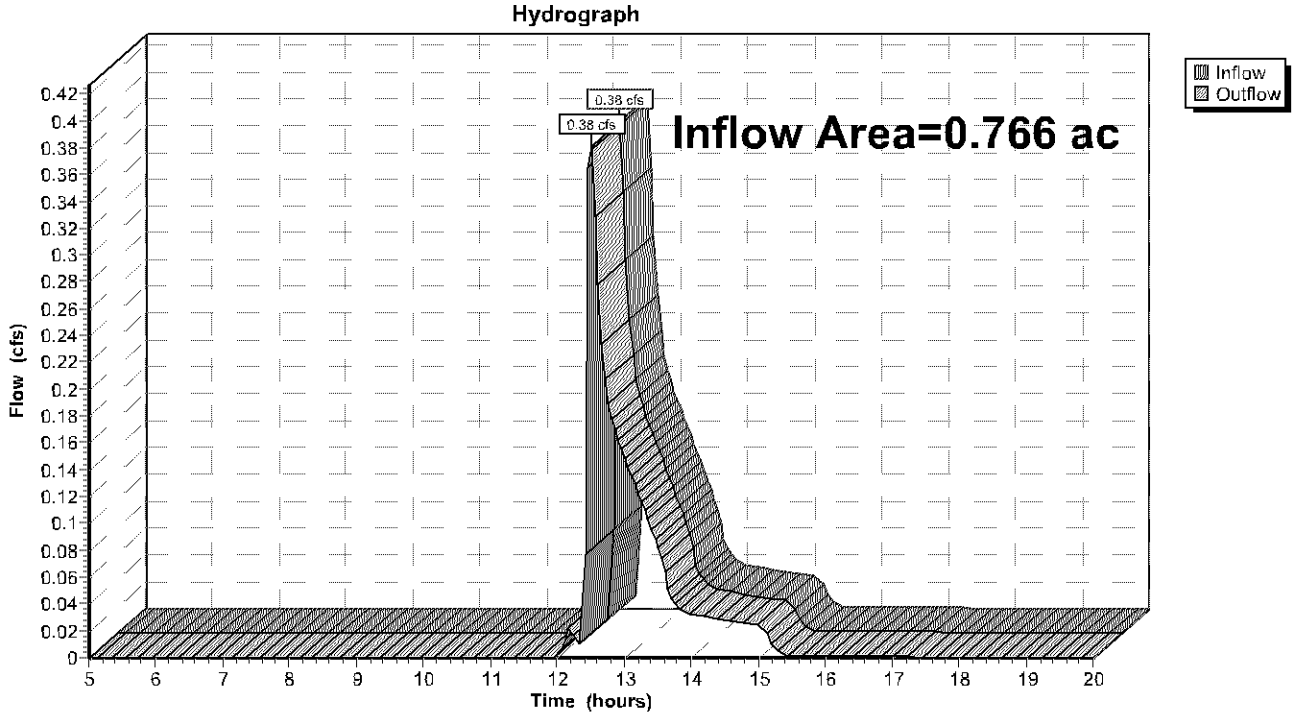
Summary for Reach 10R: Pro Offsite

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 0.766 ac, 80.94% Impervious, Inflow Depth > 0.34" for 2-Year event
Inflow = 0.38 cfs @ 12.49 hrs, Volume= 0.022 af
Outflow = 0.38 cfs @ 12.49 hrs, Volume= 0.022 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Reach 10R: Pro Offsite



Summary for Pond 10P: Permeable Pavers

Inflow Area = 0.733 ac, 82.54% Impervious, Inflow Depth > 1.63" for 2-Year event
Inflow = 2.14 cfs @ 12.14 hrs, Volume= 0.099 af
Outflow = 0.41 cfs @ 12.49 hrs, Volume= 0.050 af, Atten= 81%, Lag= 20.6 min
Discarded = 0.04 cfs @ 11.05 hrs, Volume= 0.029 af
Primary = 0.37 cfs @ 12.49 hrs, Volume= 0.020 af
Routed to Reach 10R : Pro Offsite

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 830.48' @ 12.49 hrs Surf.Area= 1,994 sf Storage= 2,377 cf

Plug-Flow detention time= 145.2 min calculated for 0.050 af (50% of inflow)
Center-of-Mass det. time= 83.2 min (861.3 - 778.2)

Volume	Invert	Avail.Storage	Storage Description
#1	827.50'	3,190 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc) 7,976 cf Overall x 40.0% Voids

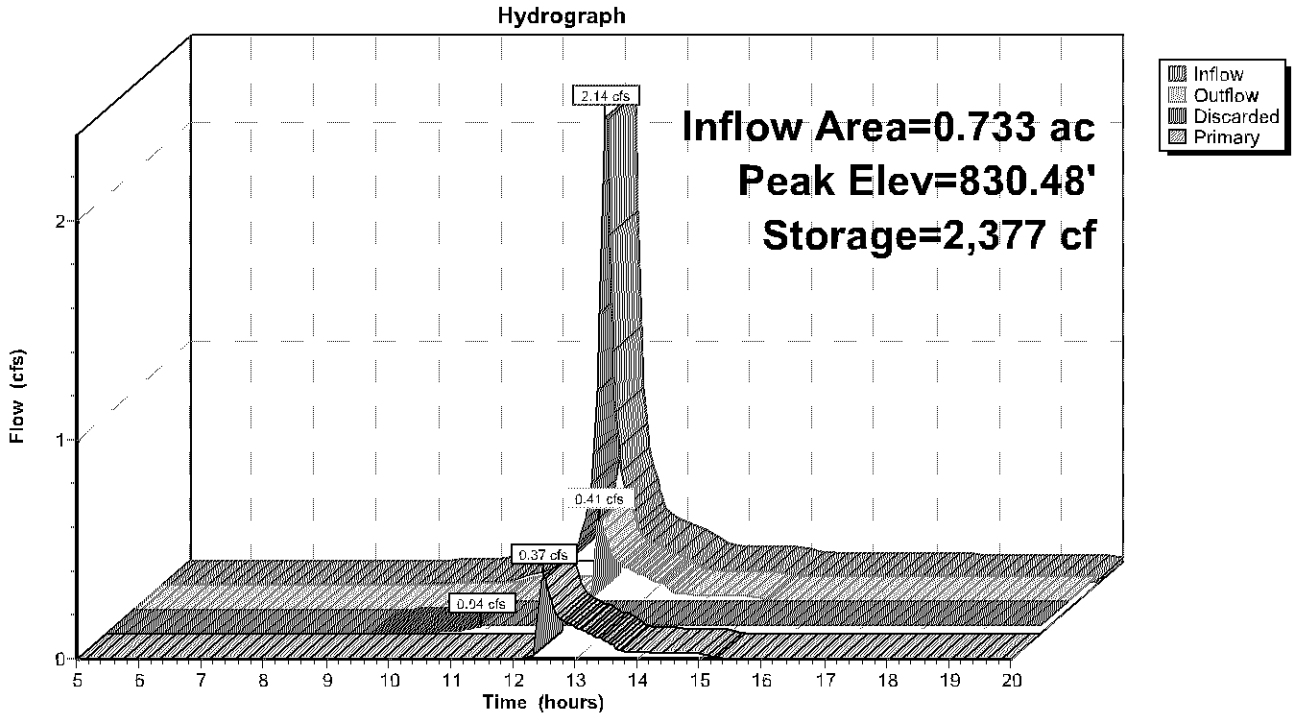
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
827.50	1,994	0	0
831.50	1,994	7,976	7,976

Device	Routing	Invert	Outlet Devices
#1	Primary	827.50'	**12.0" Round Culvert** L= 22.0' RCP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 827.50' / 827.10' S= 0.0182 '/' Cc= 0.900 n= 0.013 Concrete pipe, straight & clean, Flow Area= 0.79 sf
#2	Device 1	830.40'	**5.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)
#3	Discarded	827.50'	**0.800 in/hr Exfiltration over Horizontal area**

Discarded OutFlow Max=0.04 cfs @ 11.05 hrs HW=827.54' (Free Discharge)
↑**3=Exfiltration** (Exfiltration Controls 0.04 cfs)

Primary OutFlow Max=0.36 cfs @ 12.49 hrs HW=830.48' (Free Discharge)
↑**1=Culvert** (Passes 0.36 cfs of 5.25 cfs potential flow)
↑**2=Sharp-Crested Rectangular Weir** (Weir Controls 0.36 cfs @ 0.92 fps)

Pond 10P: Permeable Pavers



Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment10S: Proposed DA Runoff Area=0.733 ac 82.54% Impervious Runoff Depth>2.86"
Tc=7.0 min CN=88 Runoff=3.66 cfs 0.175 af

Subcatchment11S: Uncaptured Runoff Area=0.033 ac 45.45% Impervious Runoff Depth>1.17"
Tc=7.0 min CN=66 Runoff=0.07 cfs 0.003 af

Reach 10R: Pro Offsite Inflow=3.31 cfs 0.092 af
Outflow=3.31 cfs 0.092 af

Pond 10P: Permeable Pavers Peak Elev=830.74' Storage=2,588 cf Inflow=3.66 cfs 0.175 af
Discarded=0.04 cfs 0.033 af Primary=3.26 cfs 0.089 af Outflow=3.29 cfs 0.122 af

Total Runoff Area = 0.766 ac Runoff Volume = 0.178 af Average Runoff Depth = 2.79"
19.06% Pervious = 0.146 ac 80.94% Impervious = 0.620 ac

Summary for Subcatchment 10S: Proposed DA

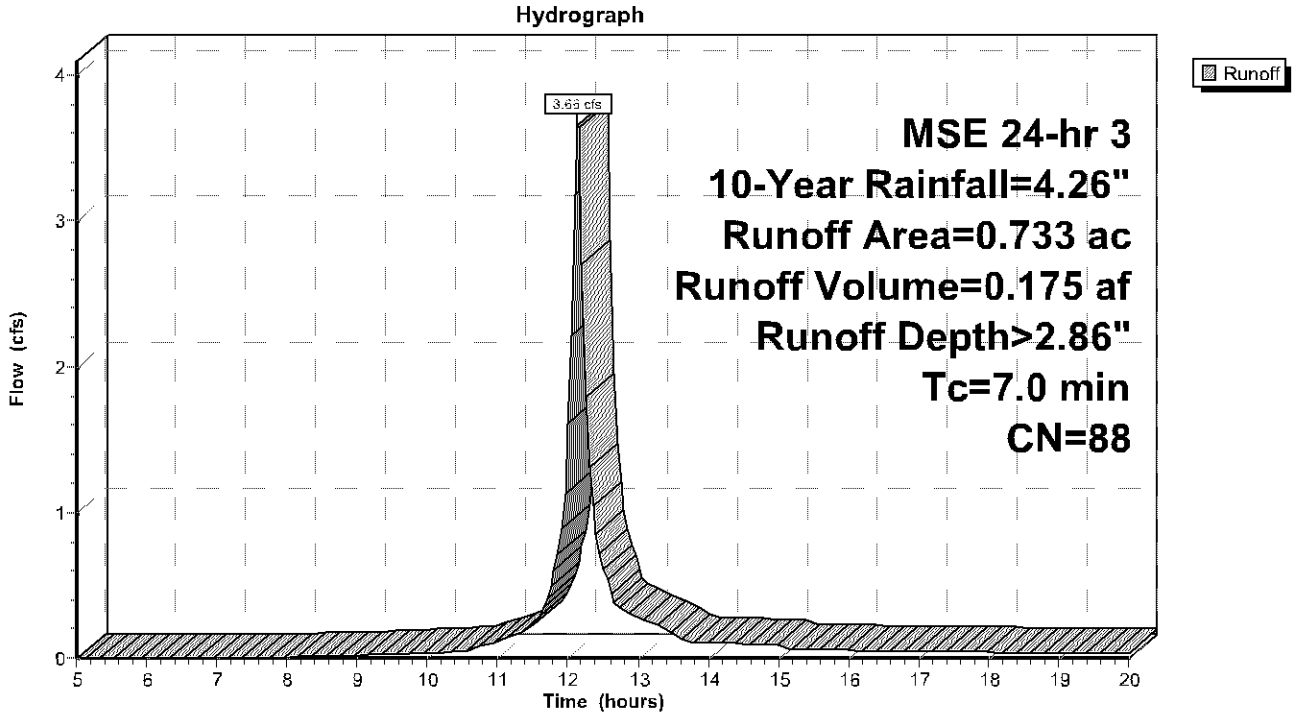
Runoff = 3.66 cfs @ 12.14 hrs, Volume= 0.175 af, Depth> 2.86"
Routed to Pond 10P : Permeable Pavers

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 10-Year Rainfall=4.26"

	Area (ac)	CN	Description
	0.559	98	Paved parking, HSG A
	0.128	39	>75% Grass cover, Good, HSG A
*	0.046	98	Permeable Pavers
	0.733	88	Weighted Average
	0.128		17.46% Pervious Area
	0.605		82.54% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0					**Direct Entry,**

Subcatchment 10S: Proposed DA



Summary for Subcatchment 11S: Uncaptured

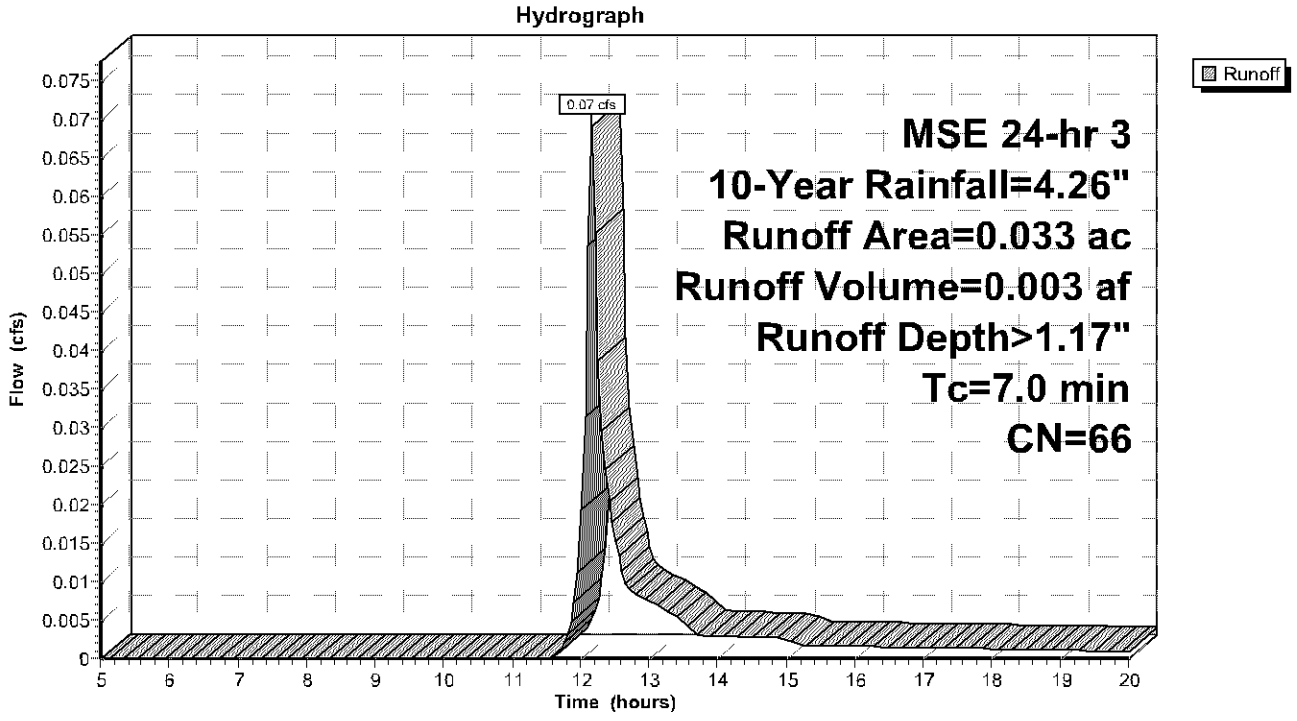
Runoff = 0.07 cfs @ 12.15 hrs, Volume= 0.003 af, Depth> 1.17"
Routed to Reach 10R : Pro Offsite

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 10-Year Rainfall=4.26"

Area (ac)	CN	Description
0.015	98	Paved parking, HSG A
0.018	39	>75% Grass cover, Good, HSG A
0.033	66	Weighted Average
0.018		54.55% Pervious Area
0.015		45.45% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0					**Direct Entry,**

Subcatchment 11S: Uncaptured



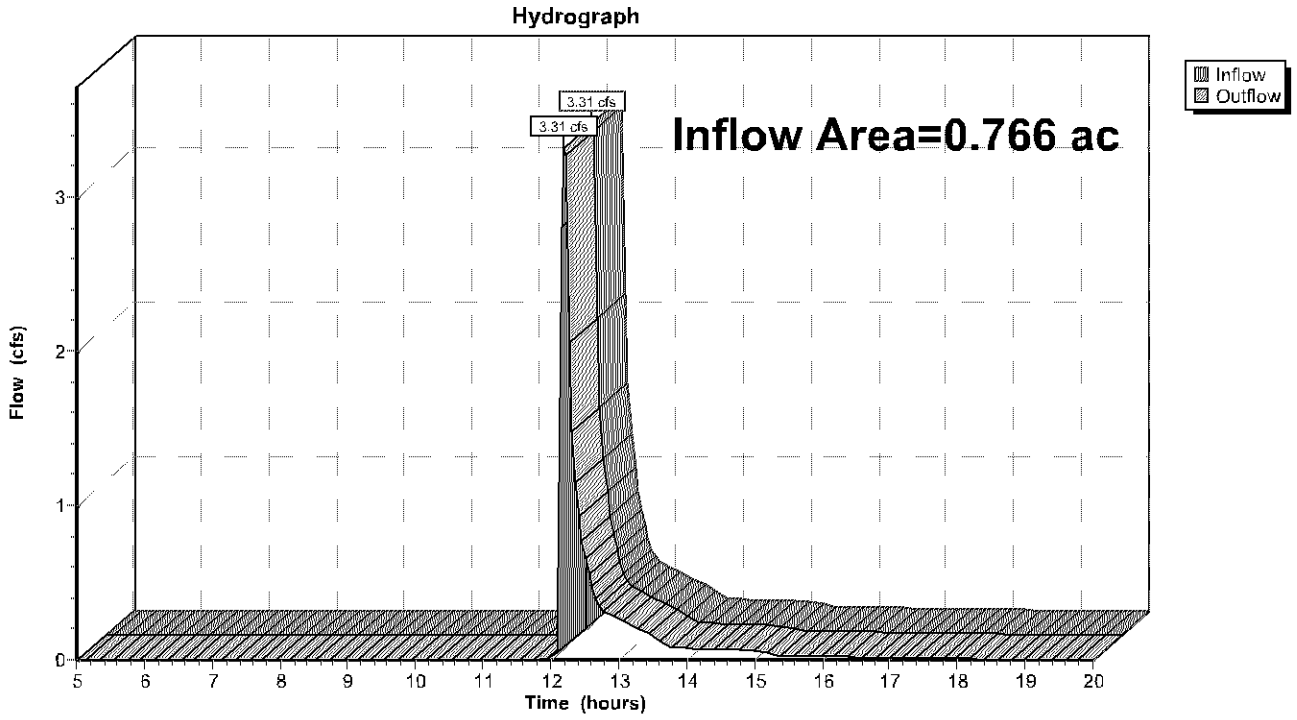
Summary for Reach 10R: Pro Offsite

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 0.766 ac, 80.94% Impervious, Inflow Depth > 1.44" for 10-Year event
Inflow = 3.31 cfs @ 12.19 hrs, Volume= 0.092 af
Outflow = 3.31 cfs @ 12.19 hrs, Volume= 0.092 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Reach 10R: Pro Offsite



Summary for Pond 10P: Permeable Pavers

Inflow Area = 0.733 ac, 82.54% Impervious, Inflow Depth > 2.86" for 10-Year event
Inflow = 3.66 cfs @ 12.14 hrs, Volume= 0.175 af
Outflow = 3.29 cfs @ 12.19 hrs, Volume= 0.122 af, Atten= 10%, Lag= 2.9 min
Discarded = 0.04 cfs @ 10.25 hrs, Volume= 0.033 af
Primary = 3.26 cfs @ 12.19 hrs, Volume= 0.089 af
Routed to Reach 10R : Pro Offsite

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 830.74' @ 12.19 hrs Surf.Area= 1,994 sf Storage= 2,588 cf

Plug-Flow detention time= 82.0 min calculated for 0.122 af (70% of inflow)
Center-of-Mass det. time= 29.3 min (797.9 - 768.6)

Volume	Invert	Avail.Storage	Storage Description
#1	827.50'	3,190 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc) 7,976 cf Overall x 40.0% Voids

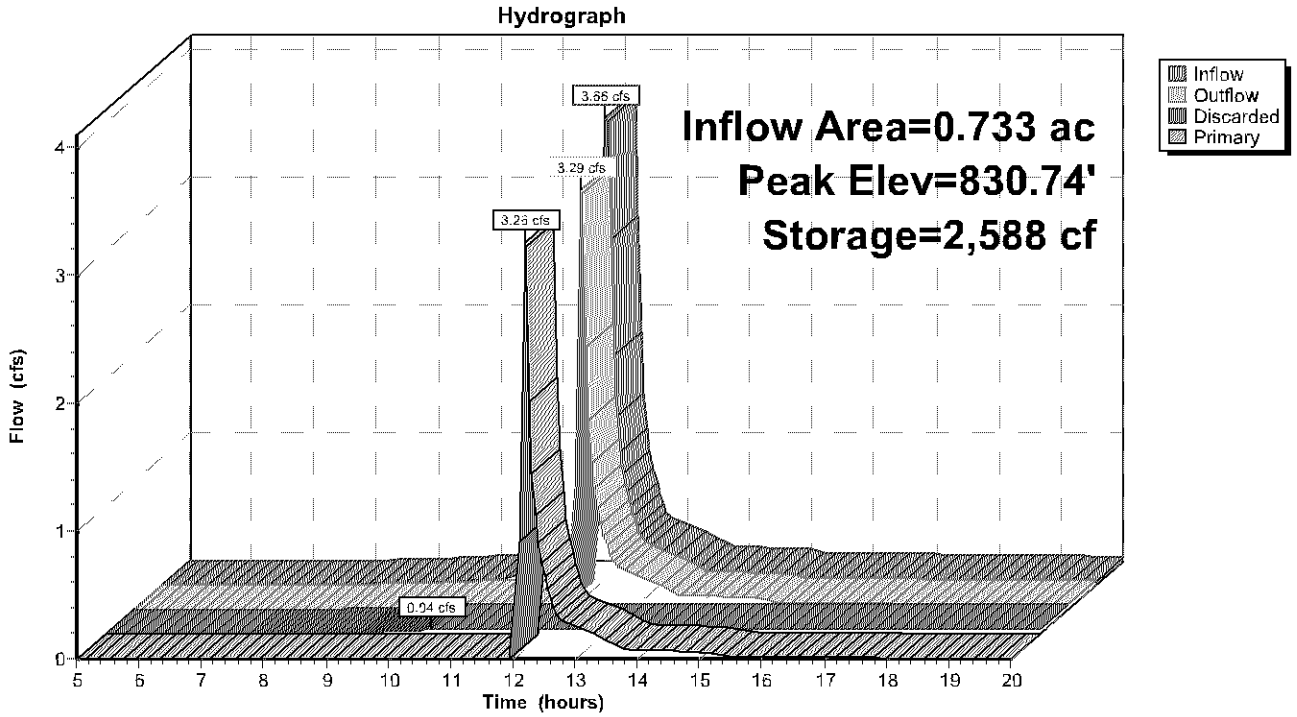
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
827.50	1,994	0	0
831.50	1,994	7,976	7,976

Device	Routing	Invert	Outlet Devices
#1	Primary	827.50'	**12.0" Round Culvert** L= 22.0' RCP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 827.50' / 827.10' S= 0.0182 '/' Cc= 0.900 n= 0.013 Concrete pipe, straight & clean, Flow Area= 0.79 sf
#2	Device 1	830.40'	**5.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)
#3	Discarded	827.50'	**0.800 in/hr Exfiltration over Horizontal area**

Discarded OutFlow Max=0.04 cfs @ 10.25 hrs HW=827.54' (Free Discharge)
↑**3=Exfiltration** (Exfiltration Controls 0.04 cfs)

Primary OutFlow Max=3.11 cfs @ 12.19 hrs HW=830.73' (Free Discharge)
↑**1=Culvert** (Passes 3.11 cfs of 5.52 cfs potential flow)
↑**2=Sharp-Crested Rectangular Weir** (Weir Controls 3.11 cfs @ 1.89 fps)

Pond 10P: Permeable Pavers



Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment10S: Proposed DA Runoff Area=0.733 ac 82.54% Impervious Runoff Depth>5.71"
Tc=7.0 min CN=88 Runoff=6.98 cfs 0.349 af

Subcatchment11S: Uncaptured Runoff Area=0.033 ac 45.45% Impervious Runoff Depth>3.30"
Tc=7.0 min CN=66 Runoff=0.20 cfs 0.009 af

Reach 10R: Pro Offsite Inflow=6.08 cfs 0.265 af
Outflow=6.08 cfs 0.265 af

Pond 10P: Permeable Pavers Peak Elev=831.12' Storage=2,889 cf Inflow=6.98 cfs 0.349 af
Discarded=0.04 cfs 0.040 af Primary=6.00 cfs 0.256 af Outflow=6.04 cfs 0.296 af

Total Runoff Area = 0.766 ac Runoff Volume = 0.358 af Average Runoff Depth = 5.61"
19.06% Pervious = 0.146 ac 80.94% Impervious = 0.620 ac

Summary for Subcatchment 10S: Proposed DA

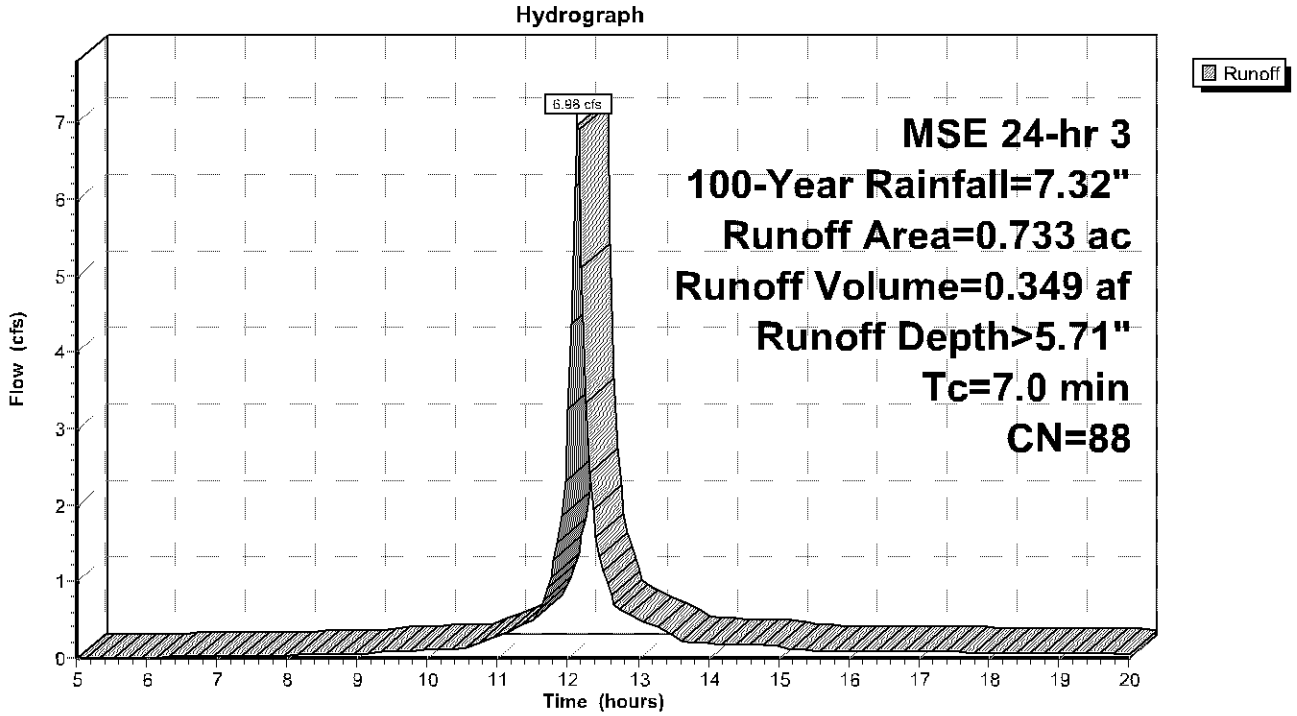
Runoff = 6.98 cfs @ 12.14 hrs, Volume= 0.349 af, Depth> 5.71"
Routed to Pond 10P : Permeable Pavers

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100-Year Rainfall=7.32"

	Area (ac)	CN	Description
	0.559	98	Paved parking, HSG A
	0.128	39	>75% Grass cover, Good, HSG A
*	0.046	98	Permeable Pavers
	0.733	88	Weighted Average
	0.128		17.46% Pervious Area
	0.605		82.54% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0					**Direct Entry,**

Subcatchment 10S: Proposed DA



Summary for Subcatchment 11S: Uncaptured

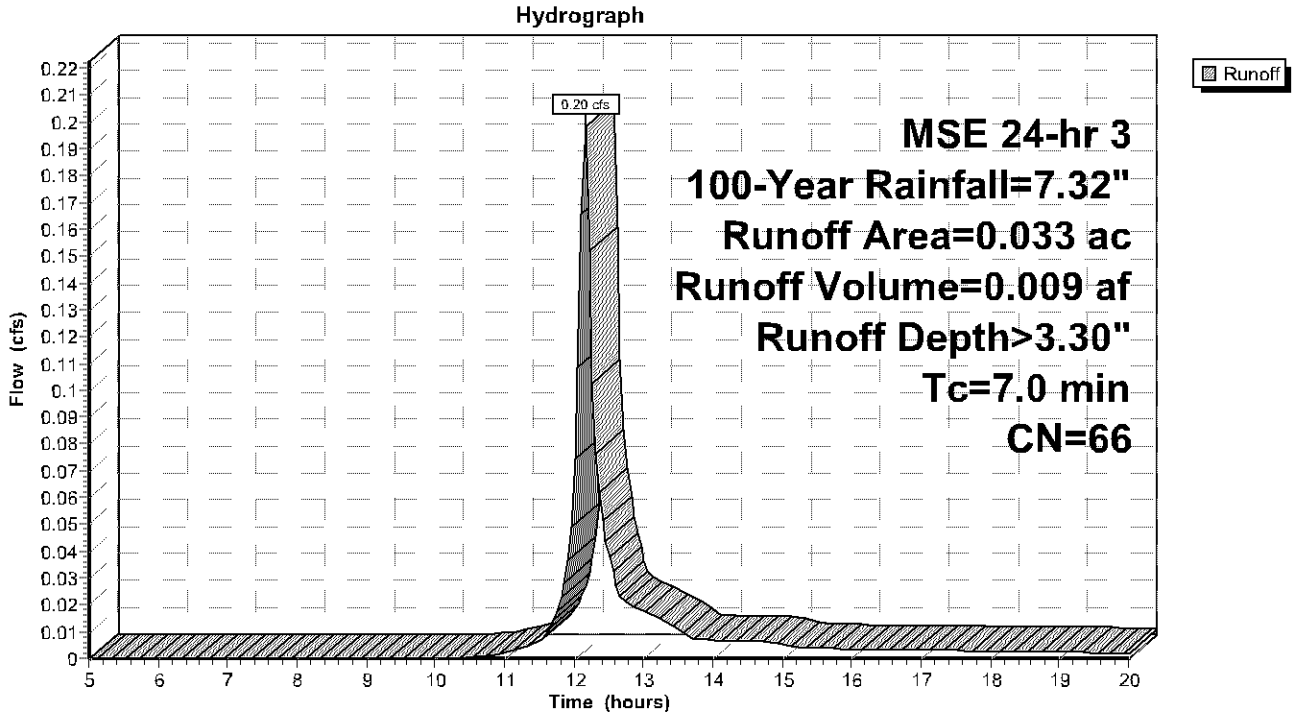
Runoff = 0.20 cfs @ 12.15 hrs, Volume= 0.009 af, Depth> 3.30"
Routed to Reach 10R : Pro Offsite

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100-Year Rainfall=7.32"

Area (ac)	CN	Description
0.015	98	Paved parking, HSG A
0.018	39	>75% Grass cover, Good, HSG A
0.033	66	Weighted Average
0.018		54.55% Pervious Area
0.015		45.45% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0					**Direct Entry,**

Subcatchment 11S: Uncaptured



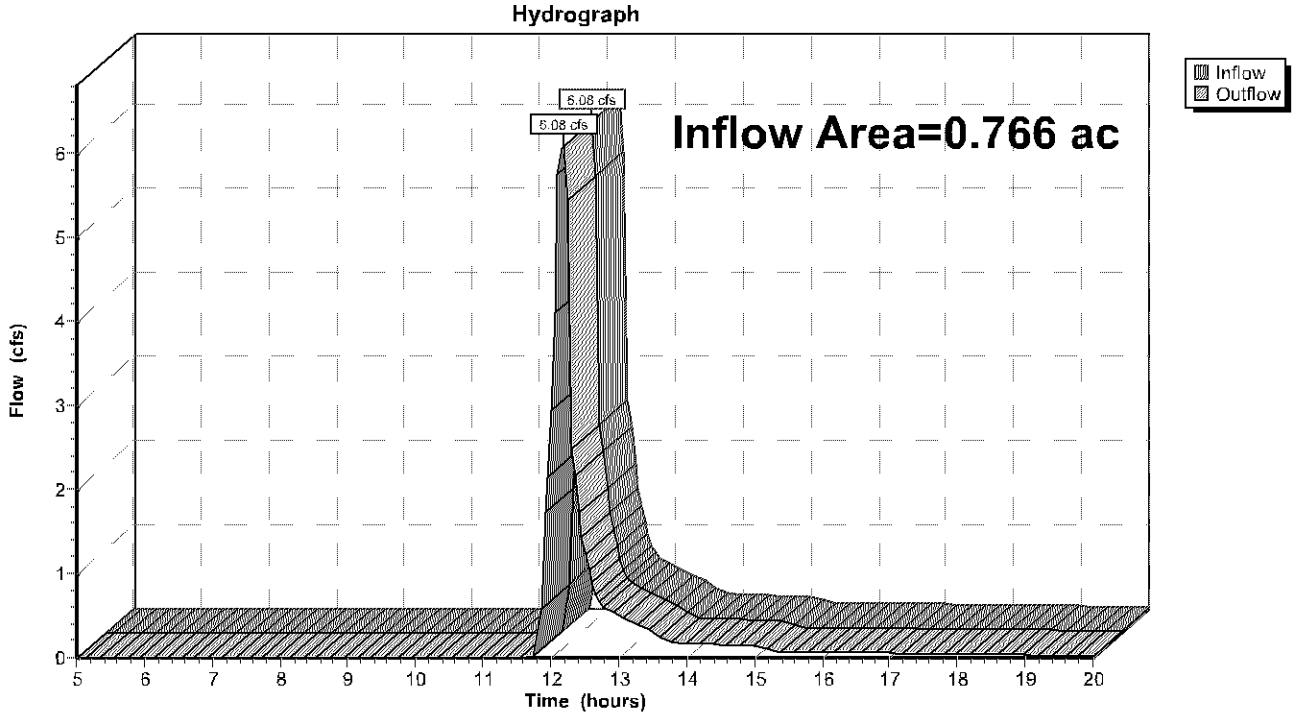
Summary for Reach 10R: Pro Offsite

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 0.766 ac, 80.94% Impervious, Inflow Depth > 4.15" for 100-Year event
Inflow = 6.08 cfs @ 12.17 hrs, Volume= 0.265 af
Outflow = 6.08 cfs @ 12.17 hrs, Volume= 0.265 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Reach 10R: Pro Offsite



Summary for Pond 10P: Permeable Pavers

Inflow Area = 0.733 ac, 82.54% Impervious, Inflow Depth > 5.71" for 100-Year event
Inflow = 6.98 cfs @ 12.14 hrs, Volume= 0.349 af
Outflow = 6.04 cfs @ 12.18 hrs, Volume= 0.296 af, Atten= 13%, Lag= 2.2 min
Discarded = 0.04 cfs @ 8.45 hrs, Volume= 0.040 af
Primary = 6.00 cfs @ 12.18 hrs, Volume= 0.256 af
Routed to Reach 10R : Pro Offsite

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 831.12' @ 12.18 hrs Surf.Area= 1,994 sf Storage= 2,889 cf

Plug-Flow detention time= 56.9 min calculated for 0.296 af (85% of inflow)
Center-of-Mass det. time= 17.9 min (774.5 - 756.6)

Volume	Invert	Avail.Storage	Storage Description
#1	827.50'	3,190 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc) 7,976 cf Overall x 40.0% Voids

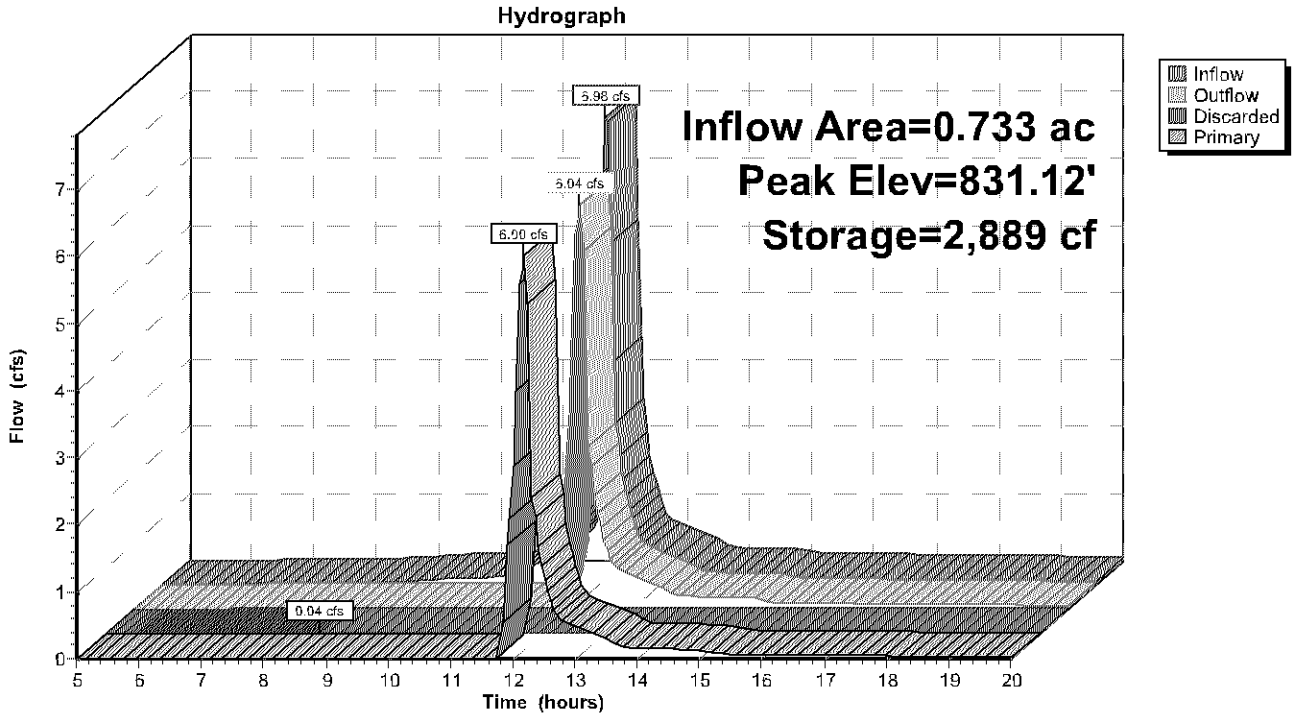
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
827.50	1,994	0	0
831.50	1,994	7,976	7,976

Device	Routing	Invert	Outlet Devices
#1	Primary	827.50'	**12.0" Round Culvert** L= 22.0' RCP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 827.50' / 827.10' S= 0.0182 '/' Cc= 0.900 n= 0.013 Concrete pipe, straight & clean, Flow Area= 0.79 sf
#2	Device 1	830.40'	**5.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)
#3	Discarded	827.50'	**0.800 in/hr Exfiltration over Horizontal area**

Discarded OutFlow Max=0.04 cfs @ 8.45 hrs HW=827.54' (Free Discharge)
↑**3=Exfiltration** (Exfiltration Controls 0.04 cfs)

Primary OutFlow Max=5.86 cfs @ 12.18 hrs HW=831.09' (Free Discharge)
↑**1=Culvert** (Inlet Controls 5.86 cfs @ 7.46 fps)
↑**2=Sharp-Crested Rectangular Weir** (Passes 5.86 cfs of 9.04 cfs potential flow)

Pond 10P: Permeable Pavers



Stage-Area-Storage for Pond 10P: Permeable Pavers

Elevation (feet)	Surface (sq-ft)	Horizontal (sq-ft)	Storage (cubic-feet)
827.50	**1,994**	**1,994**	0
827.60	1,994	1,994	80
827.70	1,994	1,994	160
827.80	1,994	1,994	239
827.90	1,994	1,994	319
828.00	1,994	1,994	399
828.10	1,994	1,994	479
828.20	1,994	1,994	558
828.30	1,994	1,994	638
828.40	1,994	1,994	718
828.50	1,994	1,994	798
828.60	1,994	1,994	877
828.70	1,994	1,994	957
828.80	1,994	1,994	1,037
828.90	1,994	1,994	1,117
829.00	1,994	1,994	1,196
829.10	1,994	1,994	1,276
829.20	1,994	1,994	1,356
829.30	1,994	1,994	1,436
829.40	1,994	1,994	1,515
829.50	1,994	1,994	1,595
829.60	1,994	1,994	1,675
829.70	1,994	1,994	1,755
829.80	1,994	1,994	1,834
829.90	1,994	1,994	1,914
830.00	1,994	1,994	1,994
830.10	1,994	1,994	2,074
830.20	1,994	1,994	2,154
830.30	1,994	1,994	2,233
830.40	1,994	1,994	2,313
830.50	1,994	1,994	2,393
830.60	1,994	1,994	2,473
830.70	1,994	1,994	2,552
830.80	1,994	1,994	2,632
830.90	1,994	1,994	2,712
831.00	1,994	1,994	2,792
831.10	1,994	1,994	2,871
831.20	1,994	1,994	2,951
831.30	1,994	1,994	3,031
831.40	1,994	1,994	3,111
831.50	1,994	1,994	**3,190**

D - MIDS RESULTS

Project Information

Calculator Version:	Version 4: July 2020
Project Name:	Gyropolis
User Name / Company Name:	Anderson Engineering
Date:	9-27-2022
Project Description:	
Construction Permit?:	Yes

Site Information

Retention Requirement (inches):	1.1
Site's Zip Code:	55431
Annual Rainfall (inches):	31.3
Phosphorus EMC (mg/l):	0.3
TSS EMC (mg/l):	54.5

Total Site Area

Land Cover	A Soils (acres)	B Soils (acres)	C Soils (acres)	D Soils (acres)	Total (acres)
Forest/Open Space - Undisturbed, protected forest/open space or reforested land					0
Managed Turf - disturbed, graded for yards or other turf to be mowed/managed	0.192				0.192
				Impervious Area (acres)	0.574
				Total Area (acres)	0.766

Site Areas Routed to BMPs

Land Cover	A Soils (acres)	B Soils (acres)	C Soils (acres)	D Soils (acres)	Total (acres)
Forest/Open Space - Undisturbed, protected forest/open space or reforested land					0
Managed Turf - disturbed, graded for yards or other turf to be mowed/managed	0.174				0.174
				Impervious Area (acres)	0.559
				Total Area (acres)	0.733

Summary Information

Performance Goal Requirement

Performance goal volume retention requirement:	2292	ft3
Volume removed by BMPs towards performance goal:	2232	ft^3
Percent volume removed towards performance goal	**97**	**%**

Annual Volume and Pollutant Load Reductions

Post development annual runoff volume	1.3477	acre-ft
Annual runoff volume removed by BMPs:	1.2355	acre-ft
Percent annual runoff volume removed:	**92**	**%**
Post development annual particulate P load:	0.6048	lbs
Annual particulate P removed by BMPs:	0.554	lbs
Post development annual dissolved P load:	0.495	lbs
Annual dissolved P removed by BMPs:	0.454	lbs
Total P removed by BMPs	1.008	lbs
Percent annual total phosphorus removed:	**92**	**%**
Post development annual TSS load:	199.8	lbs
Annual TSS removed by BMPs:	183.2	lbs
Percent annual TSS removed:	**92**	**%**

BMP Summary

Performance Goal Summary

BMP Name	BMP Volume Capacity (ft3)	Volume Recieved (ft3)	Volume Retained (ft3)	Volume Outflow (ft3)	Percent Retained (%)
Permeable Pavers	2313	2232	2232	0	100

Annual Volume Summary

BMP Name	Volume From Direct Watershed (acre-ft)	Volume From Upstream BMPs (acre-ft)	Volume Retained (acre-ft)	Volume outflow (acre-ft)	Percent Retained (%)
Permeable Pavers	1.3079	0	1.2355	0.0724	94

Particulate Phosphorus Summary

BMP Name	Load From Direct Watershed (lbs)	Load From Upstream BMPs (lbs)	Load Retained (lbs)	Outflow Load (lbs)	Percent Retained (%)
Permeable Pavers	0.587	0	0.5545	0.0325	94

Dissolved Phosphorus Summary

BMP Name	Load From Direct Watershed (lbs)	Load From Upstream BMPs (lbs)	Load Retained (lbs)	Outflow Load (lbs)	Percent Retained (%)
Permeable Pavers	0.4803	0	0.4537	0.0266	94

Total Phosphorus Summary

BMP Name	Load From Direct Watershed (lbs)	Load From Upstream BMPs (lbs)	Load Retained (lbs)	Outflow Load (lbs)	Percent Retained (%)
Permeable Pavers	1.0673	0	1.0082	0.0591	94

TSS Summary

BMP Name	Load From Direct Watershed (lbs)	Load From Upstream BMPs (lbs)	Load Retained (lbs)	Outflow Load (lbs)	Percent Retained (%)
Permeable Pavers	193.88	0	183.15	10.73	94

BMP Schematic

Permeable Pavers

ANDERSON

E - STORM SEWER SIZING WORKSHEET

GYROPOLIS
STORM SIZING WORK SHEET
AE PROJ # 16318 DATE: 9/27/2022

"C" Values	
Imp.	Per.
0.9	0.3

Project Location	Possible Regions
Minnesota	3,4

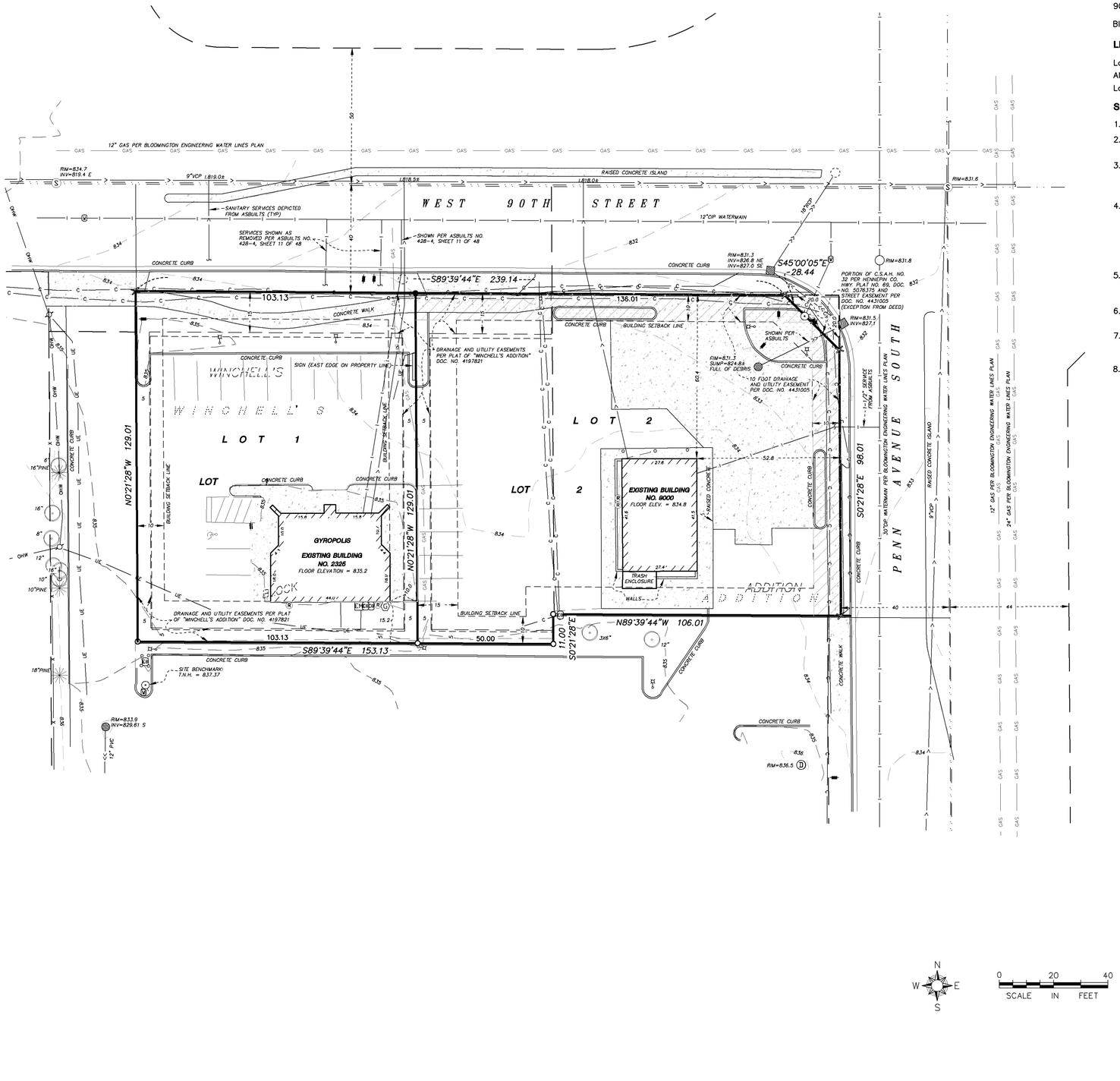
Designed For	
Region	Storm (yr)
3	10

DESIGN CHECKS

Pipe Run						Flow Calculation								Pipe Sizing						Pipe Properties	Cover					Pipe Capacity		Pipe Cover	
Struc.		Rim	Struc.		Rim	Per. Area	Imp. Area	Total Area	Area	Cumm. Area	Time of Conc (T_c)	Intensity	Q = cIA	Q cumm Q10	Pipe size	Pipe Material	slope	k	Pipe		Length of	Invert Upstream	Invert Downstream	Minimum Cover	Depth Upstream	Depth Downstream	Pipe inc Flow as Perc. of Capacity (%)	Flow Capacity Condition?	Pipe Cover (ft)	Cover Condition?
						(sf)	(sf)	(sf)	(acres)	"c" value	(min.)	I (in/24 hr)	(cfs)	(cfs)	(in.)	(material)	Slope (%)	Manning's	Capacity (cfs)	Velocity (fps)	Pipe Run (ft)	Upstream	(ft)	(ft)	(ft)	(ft)				
CBMH	3	833.00	CB	2	833.80	543	4,891	5,434	0.12	0.84	5.00	6.07	0.64	1.04	12	HDPE	2.10	42.1	6.10	4.96	52	827.50	826.41	4.40	5.50	7.39	17.0%	GOOD	4.40	GOOD
CBMH	4	834.10	CBMH	3	833.00	136	773	909	0.02	0.81	5.00	6.07	0.10	0.40	12	HDPE	1.10	42.1	4.42	2.97	65	828.60	827.89	4.02	5.50	5.12	9.1%	GOOD	4.02	GOOD
CBMH	5	834.40	CBMH	4	834.10	0	685	685	0.02	0.90	5.00	6.07	0.09	0.30	12	HDPE	0.90	42.1	3.99	2.50	45	829.30	828.90	4.00	5.10	5.21	7.5%	GOOD	4.00	GOOD
CB	6	834.00	CBMH	5	834.40	88	1,673	1,761	0.04	0.87	5.00	6.07	0.21	0.21	12	HDPE	1.00	42.1	4.21	2.23	27	829.70	829.43	3.20	4.30	4.97	5.1%	GOOD	3.20	GOOD
CBMH	8	834.00	CBMH	7	833.10	261	4,959	5,220	0.12	0.87	5.00	6.07	0.63	0.63	12	HDPE	2.30	42.1	6.39	4.44	107	827.50	825.04	5.40	6.50	8.06	9.9%	GOOD	5.40	GOOD
CB	9	832.50	CBMH	7	833.10	532	4,789	5,321	0.12	0.84	5.00	6.07	0.62	0.62	12	HDPE	3.00	42.1	7.29	4.80	40	827.50	826.30	3.90	5.00	6.80	8.5%	GOOD	3.90	GOOD
								0	0.00	-	5.00	6.07	0	0.00				#DIV/0!					0.00	-	0.00	0.00			#N/A	#N/A
								0	0.00	-	5.00	6.07	0	0.00				#DIV/0!					0.00	-	0.00	0.00			#N/A	#N/A

PL202200183

F - CIVIL PLANS



EXISTING CONDITIONS SURVEY
FOR: HTG ARCHITECTS

SITE ADDRESSES:

2325 90th Street West, (Lot 1)
AND
9000 Penn Avenue South, (Lot 2)

Bloomington, Minnesota.

LEGAL DESCRIPTION:

Lot 1 Block 1, WINCHELL'S ADDITION, Hennepin County County, Minnesota.
AND
Lot 2 Block 1, WINCHELL'S ADDITION, Except Road, Hennepin County County, Minnesota.

SURVEY NOTES:

1. The horizontal datum and bearings are based on the Hennepin County Coordinate System NAD83(2011).
2. The vertical datum is NAVD 88. The site benchmark is the top nut of the hydrant located near the southwest corner of Lot 1 (depicted hereon). Elevation = 837.37 feet.
3. The area of Lot 1 is 13,304 square feet or 0.3054 acres.

   The area of Lot 2 is 18,958 square feet or 0.4352 acres. The area of Lot 2, less the lands per HENNEPIN COUNTY HIGHWAY RIGHT-OF-WAY PLAT NO. 69, is 18,758 square feet or 0.4306 acres.
4. The location and extent of underground utilities, if shown, are based upon existing drawings provided by the utility companies, above ground evidence and Gopher State One Call markings per ticket number 220060272 and 220060275. Exclusive of excavation, there is no guarantee as to the accuracy or the completeness of this information. The size and location should be considered approximate. Additional underground utilities may be present. Verification of the existence and location of all utilities should be obtained from the utility owners prior to any planning or design. In accordance with State Statute, the location of utilities shall be confirmed prior to any demolition or construction.
5. The tree information shown hereon was collected during the field survey by non-forestry trained Anderson Engineering of Minnesota survey personnel. Tree sizes are estimates and locations are accurate to plus or minus three feet.
6. No title work was provided for the preparation of this survey to verify the legal description or the existence of any easements or encumbrances.
7. At the time of this survey, portions of the subject property were covered in significant amounts of snowfall, snow piles and ice. Some catch basins were observed to be full of ice and snow. Some improvements may not be depicted.
8. According to the City of Bloomington, the subject property is zoned B-4 (Neighborhood Commercial Center) and has the building setback requirements listed below. It is recommended that the property owner obtain a zoning letter from the City to verify all conditions that affect the property through the city zoning ordinance. This survey does not purport to describe all conditions contained in said ordinance.

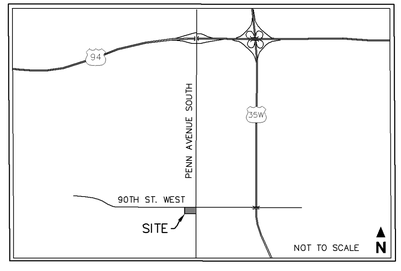
BUILDING SETBACKS

Front	=	10 feet
Side	=	10 feet
Rear	=	15 feet

LEGEND

- CATCH BASIN
- ELECTRIC BOX
- ELECTRIC METER
- GAS METER
- GUARD POST
- HANDICAP PARKING
- HYDRANT
- LIGHT POLE
- MANHOLE
- MANHOLE NOT FIELD VERIFIED
- POWER POLE
- POWER POLE ANCHOR
- ROOF DRAIN
- SANITARY MANHOLE
- SEMAPHORE
- SIGN
- WATER VALVE
- FOUND IRON MONUMENT
- SET 1/2"X14" IRON PIPE MARKED L.S. NO. 43501
- SCRIBED "X" IN SURFACE
- CONIFEROUS TREE
- DECIDUOUS TREE
- COMMUNICATION
- FENCE
- GAS MAIN
- OVERHEAD WIRES
- SANITARY SEWER
- STORM SEWER
- UNDERGROUND ELECTRIC
- WATER MAIN
- BITUMINOUS SURFACE
- CONCRETE SURFACE
- LANDSCAPE ROCK
- LANDSCAPE WOODCHIPS
- DEPRESSION CONTOUR
- CIP CAST IRON PIPE
- VCP VITRIFIED CLAY PIPE

VICINITY MAP



HTG architects

www.htg-architects.com
Minneapolis Tampa Bismarck

9300 Hennepin Town Road
Minneapolis, MN 55347
Tel: 952.278.8880
Fax: 952.278.8822

PROJECT

GYROPOLIS

ADDITION/REMODELING

2325 W 90TH ST
BLOOMINGTON, MINNESOTA

ISSUED SET		
REVISIONS		
DATE	NO.	
9/27/22	1	CITY SUBMITTAL

I HEREBY CERTIFY THAT THIS SURVEY WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION, AND THAT I AM A DULY LICENSED LAND SURVEYOR UNDER THE LAWS OF THE STATE OF MINNESOTA.

DAVID ANDERSON, LS

43501	1/28/22
MN. REG. NO.	DATE

ANDERSON
13605 1st Avenue N. #100
Plymouth, MN 55441 | ae-mn.com
P 763.412.4000 | F 763.412.4090
Anderson Engineering of Minnesota, LLC

EXISTING CONDITIONS SURVEY

DRAWN BY: BF CHECKED BY: BF

C1

16318(AEMN)

PL202200183

KEY NOTES

1. REMOVE EXISTING CONCRETE CURB AND GUTTER (TYP.).
2. REMOVE EXISTING CONCRETE APRON. RESTORE WEST 90TH ST PAVEMENT, CONCRETE CURB AND GUTTER, AND BOULEVARD PER CITY OF BLOOMINGTON STANDARDS.
3. REMOVE EXISTING CONCRETE WALK PER LIMITS SHOWN.
4. REMOVE EXISTING GAS STATION STRUCTURE IN ITS ENTIRETY.
5. REMOVE EXISTING PAVEMENT WITHIN CONSTRUCTION LIMITS.
6. CONTRACTOR TO COORDINATE RELOCATION OF EXISTING UNDERGROUND SERVICE WITH RESPECTIVE UTILITY COMPANY
7. ABANDON WATER SERVICE AT MAIN PER CITY STANDARDS
8. REMOVE & REPLACE IN-KIND FOR UTILITY CONNECTIONS. PROVIDE STAGE APPROPRIATE TRAFFIC CONTROL MEASURES PER MUTCD
9. REMOVE EXISTING WATER SERVICE
10. REMOVE EXISTING SANITARY SEWER SERVICE TO ROW LINE
11. REMOVE EXISTING STORM SEWER AND MANHOLE AS SHOWN

GENERAL NOTES

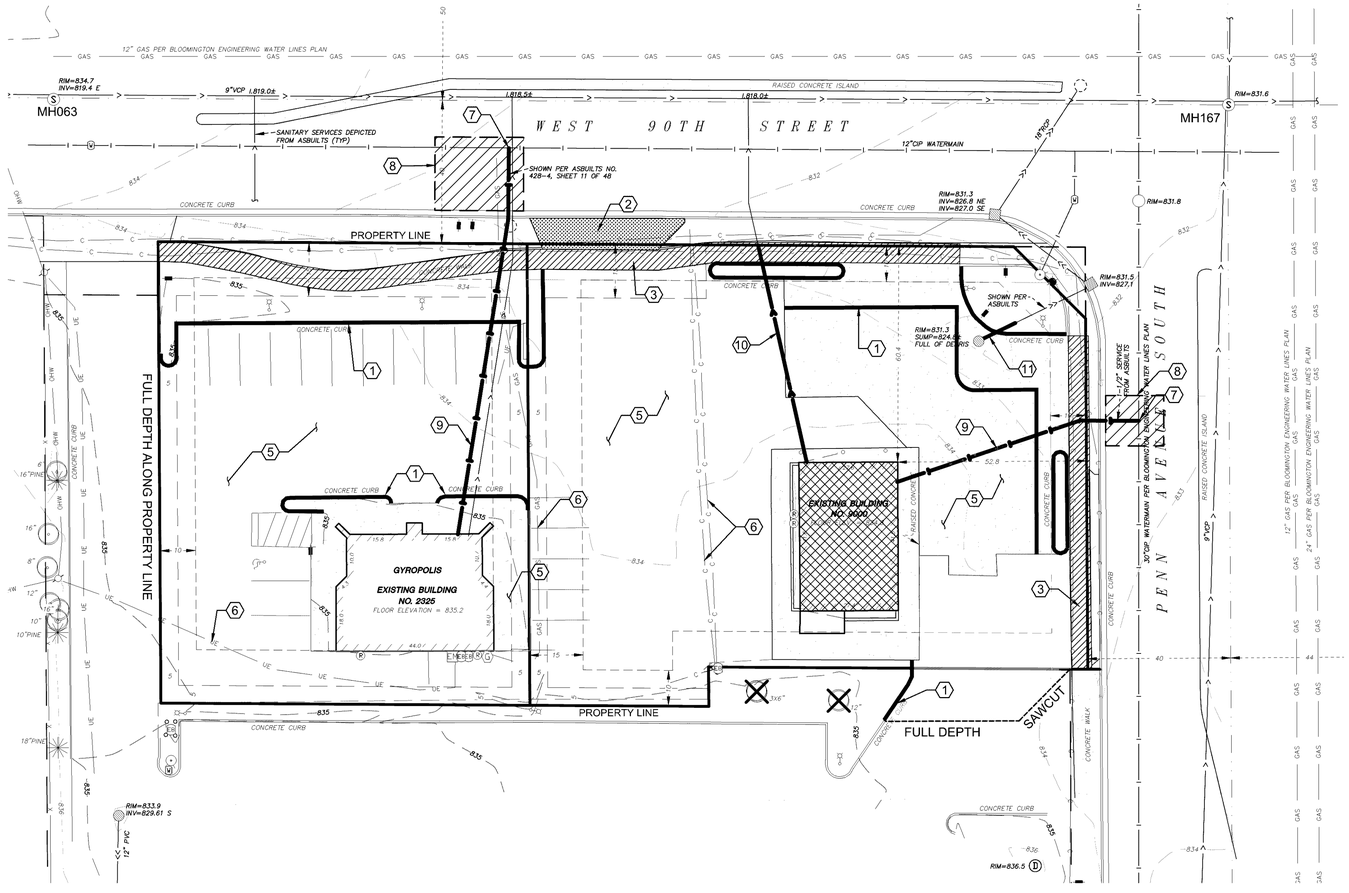
1. UTILITIES SHOWN HERE ARE FOR INFORMATIONAL USE ONLY AND ARE NOT GUARANTEED IN THEIR ACCURACY. VERIFY WORK. NOTIFY ENGINEER OF ANY/ALL DISCREPANCIES IMMEDIATELY.
2. CONTRACTOR SHALL HIRE PRIVATE UTILITY LOCATOR AS NECESSARY TO VERIFY UNDERGROUND UTILITIES. UTILITIES SHOWN ON PLANS MAY VARY FROM EXISTING CONDITIONS, AND CONTRACTOR IS RESPONSIBLE FOR ANY DAMAGE CAUSED TO UTILITY LINES SHOWN, NOT SHOWN, OR SHOWN INCORRECTLY.
3. UTILITIES MUST BE LOCATED PRIOR TO EXCAVATION OR GRADING ON ANY SITE. CALL GOPHER SATE ONE CALL AT 1-800-252-1166 AS SOON AS POSSIBLE TO SCHEDULE UTILITY LOCATIONS FOR THIS SITE.
4. A MINIMUM OF 24-HOUR NOTICE IS REQUIRED WHEN SCHEDULING INSPECTIONS. PLEASE FORWARD THIS INFORMATION TO ANY AND ALL AFFECTED SUB-CONTRACTORS FOR THIS PROJECT.

LEGEND

- PROPERTY LIMITS
- EXISTING WATERMAIN
- EXISTING SANITARY SEWER
- EXISTING STORM SEWER
- EXISTING FENCE
- EXISTING GAS MAIN
- EXISTING OVERHEAD WIRES
- EXISTING TELEPHONE
- EXISTING UNDERGROUND ELECTRIC
  EXISTING HYDRANT AND GV
- EXISTING SANITARY MANHOLE
- EXISTING STORM SEWER INLET
- REMOVE EXISTING BUILDING STRUCTURE
- REMOVE EXISTING APRON
- REMOVE EXISTING CONCRETE WALK
- REMOVE EXISTING CONCRETE C&G
- REMOVE TREE

N

0 20' 40'



CALL 48 HOURS BEFORE DIGGING
Utilities Underground Location Center
DIAL 811
811
Know what's below, Call before you dig.

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Minneapolis Tampa Bismarck
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Fax: 952.278.8822

PROJECT

GYROPOLIS

ADDITION/REMODELING

2325 W 90TH ST
BLOOMINGTON, MINNESOTA

ISSUED SET		
REVISIONS		
DATE	NO.	
9/27/22	1	CITY SUBMITTAL

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION, AND THAT I AM A DULY LICENSED CIVIL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA

NOT FOR CONSTRUCTION

Brian Field, PE

56013 — REG. NO. — 09/27/2022 — DATE

ANDERSON
13605 1st Avenue N., #100
Plymouth, MN 55441 | ae-mn.com
P 763.412.4000 | F 763.412.4090
Anderson Engineering of Minnesota, LLC

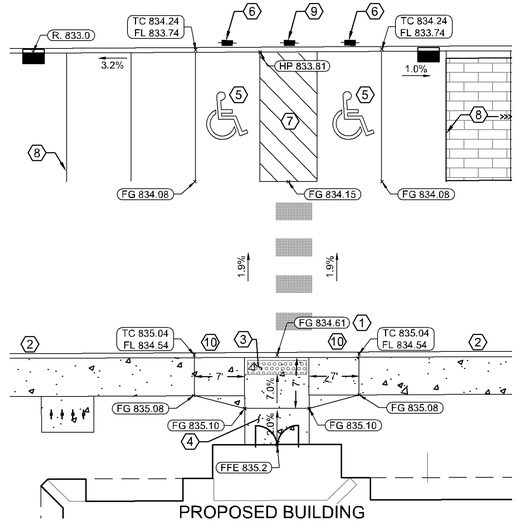
DEMOLITION PLAN

DRAWN BY: BF CHECKED BY: BF

C2

16318 (AEMN)

PL202200183



1 PEDESTRIAN CURB RAMP ENLARGEMENT

SCALE:1"=10'

0 10' 20'

KEY NOTES

1. 0" CURB HEIGHT FOR FULL LENGTH OF CONCRETE WALK.
2. FULL CURB HEIGHT
3. DETECTABLE WARNING MAY BE PART OF 4'X4' LANDING AREA IF IT IS NOT FEASIBLE TO CONSTRUCT THE LANDING OUTSIDE OF THE DETECTABLE WARNING AREA.
4. 4' BY 4' MIN. LANDING WITH MAX. 2.0% SLOPE IN ALL DIRECTIONS
5. WHITE REFLECTIVE PAINT RECTANGLE CENTERED AROUND ACCESSIBILITY PARKING SYMBOL. LINE TO BE 3 INCHES WIDE, OVER A WIDTH OF 36 INCHES AND HEIGHT OF 41 INCHES PER 2009 MUTCD CODE FIGURE 3B.20.
6. HANDICAP STALL SIGN TO COMPLY WITH 2020 MN ACCESSIBILITY CODE 502.7
7. 4" PAINTED DIAGONAL LINES 45° - 3' CENTER TO CENTER.
8. 4" PAINTED PARKING STALL LINES.
9. NO PARKING SIGN. MUTCD R8-3. INSTALL MIN. OF 60" TO MAX. OF 66" HIGH MEASURED FROM HEAD OF ACCESS AISLE PAVEMENT ELEVATION TO BOTTOM OF SIGN PER 2020 MN ACCESSIBILITY CODE 502.4.4.
10. VARIABLE HEIGHT CURB

CONTRACTOR NOTES

1. PROPOSED SPOT ELEVATIONS ARE TO TOP OF FINISHED SURFACE UNLESS OTHERWISE NOTED IN LEGEND.
2. ALL CONSTRUCTION OF HANDICAP STALLS, ROUTES, & CURB RAMPS TO COMPLY WITH THE 2020 MN ACCESSIBILITY CODE.
3. CONTRACTION JOINTS SHALL BE CONSTRUCTION ALONG ALL GRADE BREAKS. ALL GRADE BREAKS SHALL BE PERPENDICULAR TO THE PATH OF TRAVEL.
4. TO ENSURE RAMPS & LANDINGS ARE PROPERLY CONSTRUCTED, LANDINGS MAY BE CAST SEPARATELY.
5. ALL SLOPES ARE ABSOLUTE, RATHER THAN RELATIVE TO SIDEWALK/ROADWAY GRADES.
6. TOP OF CURB SHALL MATCH PROPOSED ADJACENT WALK GRADE.
7. FOUR FOOT MIN WIDTH OF DETECTABLE WARNING IS REQUIRED FOR ALL RAMPS. DETECTABLE WARNINGS SHALL CONTINUOUSLY EXTEND FOR A MIN. OF 24" IN THE PATH OF TRAVEL.

SPOT ELEVATION KEY

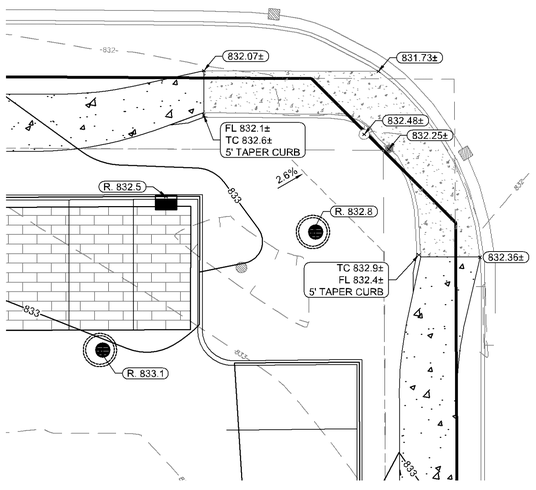
±	EXISTING GRADE
HP	HIGH POINT ELEVATION
TC	TOP OF CURB ELEVATION
R.	RIM ELEVATION
I.	INVERT ELEVATION

N

0 20' 40'

LEGEND

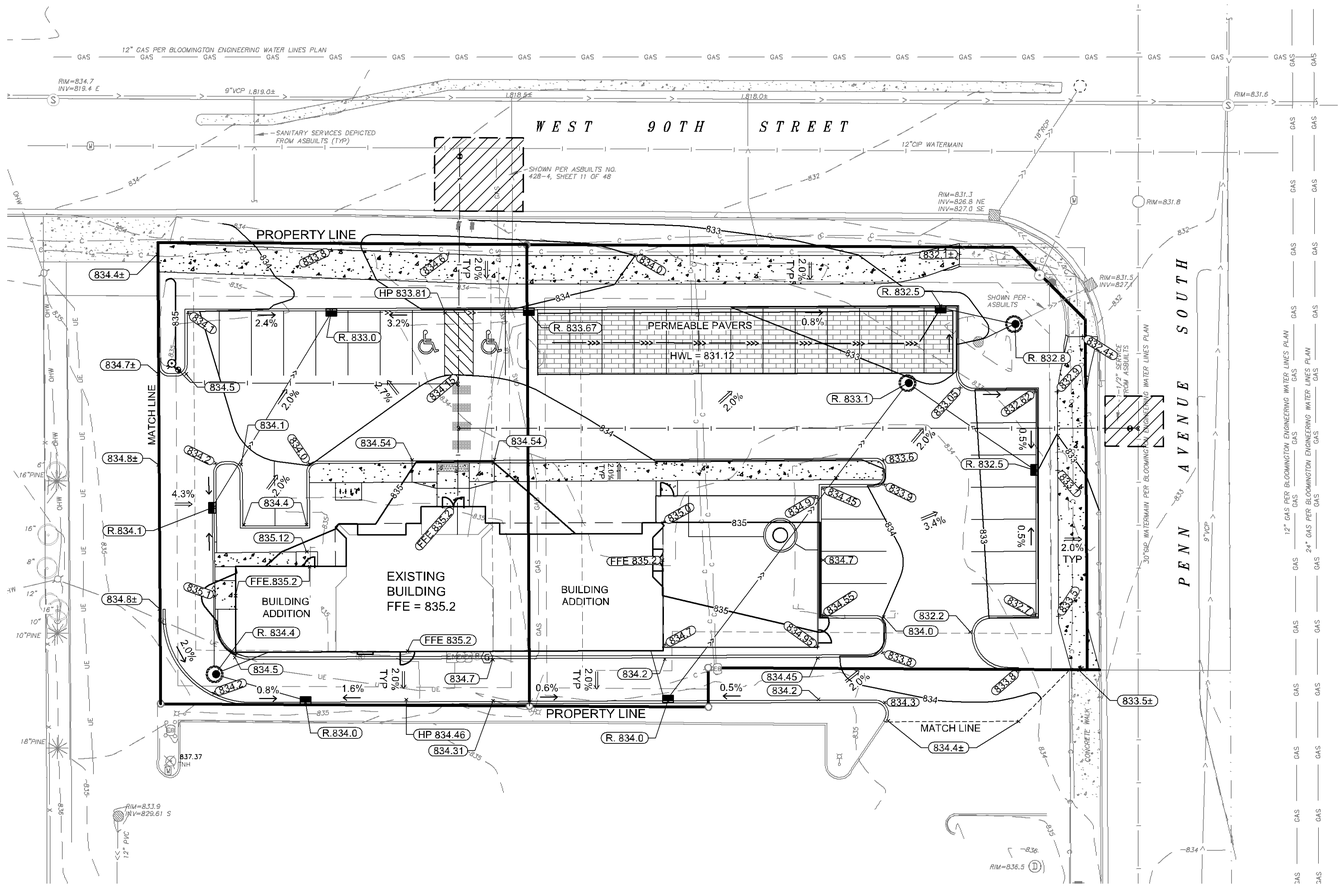
	PROPERTY LIMITS
966	EXISTING MINOR CONTOUR
965	EXISTING MAJOR CONTOUR
966	PROPOSED MINOR CONTOUR
965	PROPOSED MAJOR CONTOUR
× 959.4	EXISTING SPOT ELEVATION
⟹	DRAINAGE ARROW
	PROPOSED CONCRETE C&G



2 NE CORNER ENLARGEMENT

SCALE:1"=10'

0 10' 20'



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NOT FOR CONSTRUCTION

Brian Field, PE

56013 09/27/2022
REG. NO. DATE

ANDERSON

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Plymouth, MN 55441 | ae-mn.com
P 763.412.4000 | F 763.412.4090
Anderson Engineering of Minnesota, LLC

GRADING & DRAINAGE PLAN

DRAWN BY: BF CHECKED BY: BF

C3

16318 (AEMN)

GENERAL NOTES

1. ALL CONSTRUCTION SHALL COMPLY WITH RECOMMENDATIONS OF THE SOIL ENGINEER UNLESS DIRECTED OTHERWISE.
2. ALL CONSTRUCTION SHALL COMPLY WITH THE MOST CURRENT CITY OF BLOOMINGTON CODE AND STANDARDS, AND THE 2016 EDITION OF MNDOT STANDARD CONSTRUCTION SPECIFICATIONS (INCLUDING SUPPLEMENTS) AND THE C.E.A.M. STANDARD SPECIFICATIONS-2013 EDITION UNLESS DIRECTED OTHERWISE.
3. ALL CONSTRUCTION SHALL COMPLY WITH APPLICABLE MUNICIPAL, WATERSHED DISTRICT, COUNTY, MPCA, DEPT. OF HEALTH, AND MNDOT PERMITS.
4. THE LOCATION AND TYPE OF EXISTING UTILITIES SHOWN ON THE PLANS ARE FOR GENERAL INFORMATION ONLY. THE INFORMATION IS NOT WARRANTED TO BE ACCURATE OR COMPLETE. THE CONTRACTOR, IN COOPERATION WITH THE APPROPRIATE UTILITY COMPANY OR MUNICIPALITY, IS RESPONSIBLE FOR VERIFYING THE LOCATION AND DEPTH OF ALL UNDERGROUND UTILITIES.
5. PROVIDE MINIMUM 10' HORIZONTAL & 18" VERTICAL SEPARATION OF ALL WATERMAIN CROSSINGS FROM STORM OR SANITARY SEWER.
6. ALL WATER SERVICE SHALL BE INSTALLED WITH 8' MINIMUM COVER FROM FINISHED GRADE, MAX 10 FEET.
7. HDPE PIPE CONNECTIONS INTO ALL CONCRETE STRUCTURES MUST BE MADE WITH WATER TIGHT MATERIALS UTILIZING AN A-LOK OR WATERSTOP GASKET OR BOOT, CAST-IN-PLACE RUBBER BOOT, OR APPROVED EQUAL. WHERE THE ALIGNMENT PRECLUDES THE USE OF THE ABOVE APPROVED WATERTIGHT METHODS, CONSEAL 231 WATERSTOP SEALANT, OR APPROVED EQUAL WILL ONLY BE ALLOWED AS APPROVED BY THE ENGINEER.
8. ALL NEW NON METALLIC SANITARY AND WATER SERVICE PIPE SHALL HAVE TRACER WIRE, PER SPECIFICATIONS.
9. LOCATE AND PROTECT EXISTING UTILITIES UNLESS OTHERWISE NOTED.
10. SUBSTITUTIONS FROM INFO. SHOWN HEREON SHALL BE REVIEWED AND APPROVED BY THE ENGINEER OF RECORD AND CITY ENGINEER.
11. ALL PORTIONS OF THE STORM SEWER SYSTEM LOCATED WITHIN 10 FEET OF A BUILDING OR WATER SERVICE LINE MUST BE TESTED IN ACCORDANCE WITH MINNESOTA RULES, CHAPTER 4714 , SECTION 1109.0. TESTING OF WATER AND SEWER SHALL COMPLY WITH 2013 CEAM REQUIREMENTS.
12. PVC SANITARY SEWER MUST MEET ASTM STANDARDS LISTED IN MINNESOTA RULES, CHAPTER 4714,TABLE 701.1 AND INSTALLATION STANDARD 1. FITTINGS 4 T 15 INCHES IN DIAMETER, SHALL CONFORM TO ASTM D3034, TYPE PSM, SDR 26. PIPE AND FITTINGS SHALL HAVE ELASTOMERIC GASKET JOINTS PROVIDING A WATERTIGHTS SEAL WHEN TESTED IN ACCORDANCE WITH ASTM D3212. JOINTS SEALS ARE TO BE MECHANICAL CLAMP RING TYPE, STAINLESS STEEL EXPANDING AND CONTRACTING SLEEVE NEOPRENE RIPPED GASKET FOR POSITIVE SEAL. GASKETS SHALL CONFORM TO ASTM F477.
13. HDPE STORM SEWERS MUST MEET ASTM F714 (SEE MINNESOTA RULES, CHAPTER 4714 SECTION 1102.4 AND INSTALLATION STANDARD 1). WATER TIGHT JOINTS MUST BE USED AT ALL CONNECTION INCLUDING STRUCTURES. THE INSTALLATION MUST COMPLY WITH ASTM D2321.
14. ALL COMPONENTS OF WATER SYSTEM, UP TO THE WATER METER OR FIRE SERVICE EQUIPMENT MUST UTILIZE PROTECTIVE INTERNAL COATINGS MEETING CURRENT ANSI/AWWA STANDARDS FOR CEMENT MORTAR LINING OR SPECIAL COATING. THE USE OF UNLINED OR UNCOATED PIPE IS NOT ALLOWED. PROVIDE 8 MIL POLYWRAP ON DIP WATERMAIN PER CITY STANDARDS.
15. COMBINATION FIRE AND DOMESTIC SERVICES MUST TERMINATE WITH A THREAD ON FLANGE OR AN MJ TO FLANGE ADAPTER.
16. UTILITY AND MECHANICAL CONTRACTORS MUST COORDINATE THE INSTALLATION OF ALL WATER AND SEWER SERVICE PIPES INTO THE BUILDING TO ACCOMMODATE CITY INSPECTION AND TESTING.
17. CONTRACTOR TO PROVIDE UTILITY AS-BUILTS TO CITY OF BLOOMINGTON PRIOR TO CERTIFICATE OF ACCUPANCY.

STRUCTURE SCHEDULE

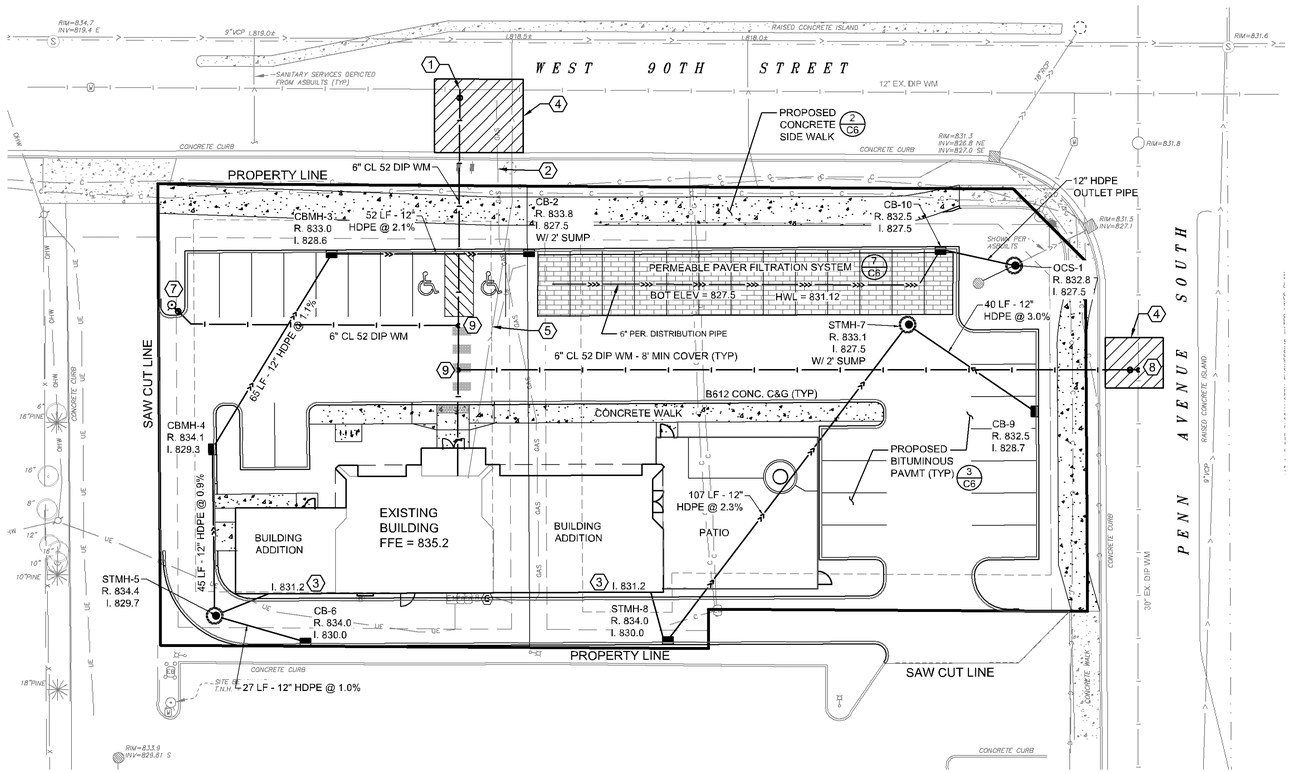
STRUCTURE NUMBER	SIZE	CASTING	NOTES
OSC-1	60"-DIA	R-1642	SOLID "STORM"
CB-2	48"-DIA	R-3067	–
CBMH-3	48"-DIA	R-3067	–
CBMH-4	48"-DIA	R-3067	–
STMH-5	48"-DIA	R-1642	SOLID "STORM"
CB-6	2'X3' REC	R-3067	–
STMH-7	48" DIA	R-1642	SOLID "STORM"
CB-8	2'X3' REC	R-3067	–
CB-9	2'X3' REC	R-3067	–
CB-10	2'X3' REC	R-3067	–

KEY NOTES

1. WET TAP EXISTING 12" WATER MAIN WITH SADDLE AND 6" GATE VALVE. REMOVE EXISTING SERVICE PER CITY OF BLOOMINGTON STANDARDS.
2. INSTALL 6" GATE VALVE AND RISER BOX.
3. INSTALL 6" - HDPE INTERNAL ROOF DRAIN FOR BUILDING ADDITION. COORDINATE FINAL LOCATION AND TYPE WITH MASTER PLUMBER.
4. REMOVE AND REPLACE IN- KIND FOR UTILITY CONNECTION PROVIDE STAGE APPROPRIATE VEHICLE AND PEDESTRIAN TRAFFIC CONTROL MEASURES PER MUTCD.
5. PROTECT EXISTING SANITARY SERVICE IN PLACE.
6. ABANDONED WATER SERVICE AT MAIN PER CITY STANDARDS.
7. INSTALL 6" HYDRANT LEAD WITH GATE VALVE (10/C6)
8. WET TAP EXISTING 30" WATER MAIN WITH SADDLE AND 6" GATE VALVE.
9. INSTALL 6X6 TEE

LEGEND

- PROPERTY LIMITS
- EXISTING WATERMAIN
- EXISTING SANITARY SEWER
- EXISTING STORM SEWER
- PROPOSED WATERMAIN
- PROPOSED STORM SEWER
- PROPOSED STORM INLETS
- PROPOSED CONCRETE WALK
- PROPOSED BITUMINOUS ASPHALT



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Minneapolis, MN 55347
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PROJECT

GYROPOLIS

ADDITION/REMODELING

2325 W 90TH ST
BLOOMINGTON, MINNESOTA

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DATE	NO.	
9/27/22	1	CITY SUBMITTAL

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NOT FOR CONSTRUCTION

Brian Field, PE

56013 — REG. NO.
09/27/2022 — DATE

ANDERSON
13605 1st Avenue N. #100
Plymouth, MN 55441 | ae-mn.com
P 763.412.4000 | F 763.412.4090
Anderson Engineering of Minnesota, LLC

UTILITY & PAVING PLAN

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STORM WATER POLLUTION PREVENTION PLAN NOTES:

1. GRADING CONTRACTORS SHALL VERIFY LOCATIONS AND ELEVATIONS OF ALL UNDERGROUND UTILITIES WITH THE RESPECTIVE UTILITY COMPANIES PRIOR TO CONSTRUCTION.
2. ALL EROSION CONTROL MEASURES CALLED FOR ON THESE PLANS AND SPECIFICATIONS, WHICH MAY INCLUDE SILT FENCE, SEDIMENTATION BASINS OR TEMPORARY SEDIMENT TRAPS, SHALL BE CONSTRUCTED AND SERVICEABLE IN THE FOLLOWING ORDER:
   A. ROCK CONSTRUCTION ENTRANCES A MINIMUM OF 50 FEET
   B. SILT FENCE
   C. TEMPORARY CULVERTS
   D. TEMPORARY SEDIMENTATION BASINS AND OUTFALL FACILITIES
   E. SORMWATER POND CONSTRUCTION
   F. COMMON EXCAVATION AND EMBANKMENT (GRADING)
   G. SEED AND MULCH OR SOD
   H. BIO-ROLL BARRIERS IN FINISHED GRADED AREAS
   I. INLET AND OUTLET FACILITIES SUBSEQUENT TO STORM SEWER WORK
3. GRADING CONTRACTOR SHALL PROVIDE AND MAINTAIN ALL EROSION CONTROL MEASURES IN ACCORDANCE WITH CITY AND NPDES PHASE II PERMITTING REQUIREMENTS AS WELL AS EROSION CONTROL MEASURES AS MAY BE SHOWN ON THESE PLANS OR SPECIFICATIONS. GRADING CONTRACTOR SHALL IMPLEMENT ANY ADDITIONAL EROSION CONTROL MEASURES AS MAY BE REQUIRED TO PROTECT ADJACENT PROPERTY.
4. ALL EROSION CONTROL FACILITIES SHALL BE MAINTAINED BY THE CONTRACTOR DURING GRADING OPERATIONS. ANY TEMPORARY FACILITIES WHICH ARE TO BE REMOVED AS CALLED FOR ON THESE PLANS AND SPECIFICATIONS SHALL BE REMOVED BY THE GRADING CONTRACTOR WHEN DIRECTED BY THE ENGINEER. THE GRADING CONTRACTOR SHALL RESTORE THE SUBSEQUENTLY DISTURBED AREA IN ACCORDANCE WITH THESE PLANS AND SPECIFICATIONS.
5. THE GRADING CONTRACTOR SHALL SCHEDULE THE SOILS ENGINEER SO THAT CERTIFICATION OF ALL CONTROLLED FILLS WILL BE FURNISHED TO THE OWNER DURING AND UPON COMPLETION OF THE PROJECT.
6. ALL DISTURBED AREAS, EXCEPT AREAS TO BE PAVED AND/OR SPECIFICALLY DESIGNED BY A LANDSCAPE PLAN, SHALL BE COVERED WITH A MINIMUM 6" OF TOP SOIL OR AS INDICATED IN SPECIFICATIONS OR LANDSCAPING PLAN. ALL DISTURBED AREAS SHALL BE SEEDED & MULCHED AT THE PRESCRIBED RATES WITHIN 72 HOURS OF FINAL GRADING UNLESS OTHERWISE NOTED.

   SEED MIX: MNDOT NO. 25-141 59# / ACRE
   MULCH: TYPE 1 2 TONS / ACRE (DISK ANCHORED)
   FERTILIZER: TYPE 3 22-5-10 350# / ACRE

   ALL EXPOSED SOIL AREAS WITH A CONTINUOUS POSITIVE SLOPE WITHIN 200 LINEAL FEET OF ANY SURFACE WATER, MUST HAVE TEMPORARY EROSION PROTECTION OR PERMANENT COVER FOR THE EXPOSED SOIL AREAS YEAR ROUND, ACCORDING TO THE FOLLOWING TABLE OF SLOPES AND TIME FRAMES:

   TYPE OF SLOPE **TIME** (Maximum time an area can remain open when the area is not actively being worked)
   STEEPER THAN 3:1 7 DAYS
   10:1 TO 3:1 4 DAYS
   FLATTER THAN 10:1 21 DAYS
7. THE EXISTING TOPOGRAPHY AND CONTOUR ELEVATIONS SHOWN ON THE PLAN WERE TAKEN FROM A PLAN FURNISHED BY OWNER.
8. CONTRACTORS GRADING AND EROSION CONTROL OPERATIONS SHALL TAKE PLACE WITHIN THE CONSTRUCTION LIMITS.
9. IT IS REQUIRED THAT SOILS TRACKED FROM THE SITE BY MOTOR VEHICLES BE CLEANED DAILY FROM PAVED ROADWAY SURFACES THROUGHOUT THE DURATION OF CONSTRUCTION.
10. PROVIDE TEMPORARY SEDIMENTATION BASINS AS DIRECTED BY THE ENGINEER.
11. ALL REQUIREMENTS OF THE LOCAL WATERSHED DISTRICT SHALL BE SATISFIED PER THE APPROVED PERMIT.
12. ALL EROSION & SEDIMENT CONTROL MEASURES SHOWN ON THIS PLAN AND IMPLEMENTED IN THE FIELD AS DIRECTED BY THE ENGINEER SHALL CONFORM TO THE MPCA'S "PROTECTING WATER QUALITY IN URBAN AREAS: BEST MANAGEMENT PRACTICES FOR MINNESOTA".
13. DEWATERING AND / OR BASIN DRAINING DISCHARGE SHALL BE DIRECTED TO SEDIMENTATION BASINS WHEREVER POSSIBLE. ALL DISCHARGE POINTS SHALL BE ADEQUATELY PROTECTED FROM EROSION & SCOUR THROUGH USE OF APPROVED ENERGY DISSIPATION DEVICES.
14. ALL SOLID WASTE / CONSTRUCTION DEBRIS SHALL BE DISPOSED OF IN ACCORDANCE WITH MPCA REQUIREMENTS. HAZARDOUS MATERIALS SHALL BE STORED / DISPOSED OF IN COMPLIANCE WITH MPCA REGULATIONS.
15. CONTRACTOR SHALL USE RAPID STABILIZATION METHODS PER MNDOT 2575 AS NEEDED DURING THE COURSE OF THE WORK TO MAINTAIN CONFORMANCE WITH THE CITY AND NPDES II PERMIT REQUIREMENTS. THIS WORK SHALL CONSIST OF OPERATIONS NECESSARY TO RAPIDLY STABILIZE SMALL CRITICAL AREA, TO PREVENT OFF SITE SEDIMENTATION AND / OR TO COMPLY WITH PERMIT REQUIREMENTS. THE WORK MAY BE PERFORMED AT ANY TIME DURING THE CONTRACT AND DURING NORMAL WORKING HOURS. THIS WORK WILL BE CONDUCTED ON SMALL AREAS THAT MAY OR MAY NOT BE ACCESSIBLE WITH NORMAL EQUIPMENT. THIS WORK SHALL BE DONE IN ACCORDANCE WITH THE APPLICABLE MNDOT STANDARDS SPECIFICATIONS, THE DETAILS SHOWN IN THE PLANS, AND THE FOLLOWING:

    THERE ARE FIVE STABILIZATION METHODS APPROVED FOR THESE OPERATIONS. THESE METHODS MAY BE CONDUCTED INDEPENDENTLY OR IN COMBINATION.

    METHOD **RAPID STABILIZATION**
    1 TYPE 1 MULCH WITH DISC ANCHORING
    2 TYPE 3 MULCH WITH TYPE HYDRAULIC MULCH
    3 TYPE HYDRAULIC MULCH WITH SEED MIXTURE 22-11
    4 CATEGORY 3 EROSION CONTROL BLANKET WITH SEED MIXTURE
    5 RIPRAP CLASS II WITH GEOTEXTILE TYPE III

    THESE EFFORTS WILL BE INCIDENTAL TO THE EROSION CONTROL BID ITEM.
16. CHANGE OF COVERAGE: FOR STORM WATER DISCHARGES FROM CONSTRUCTION PROJECTS WHERE THE OWNER OR OPERATOR CHANGES, (E.G., AN ORIGINAL DEVELOPER SELLS PORTIONS OF THE PROPERTY TO VARIOUS BUILDERS) THE NEW OWNER OR OPERATOR MUST SUBMIT A SUBDIVISION REGISTRATION WITHIN 7 DAYS OF ASSUMING TRANSFERS, SALE OR CLOSING ON THE PROPERTY.
17. INDIVIDUAL SITE BUILDERS SHALL BE RESPONSIBLE FOR PROVIDING ANY AND ALL NECESSARY EROSION CONTROL MEASURES AS MAY BE REQUIRED. REQUIRED ECM'S SHALL CONSIST OF BUT NOT BE LIMITED TOT HE FOLLOWING:
    A. STAKED FIBER LOG ROLLS AT BACK OF ALL CURB EXCEPT AT CONSTRUCTION / DRIVEWAY ENTRANCE.
    B. SILT FENCE ON ALL DOWN GRADIENT SLOPES FROM CONSTRUCTION AREA. SILT FENCE SHALL HAVE THE BOTTOM DUG IN WITH SOIL FIRMLY COMPACTED.
    C. ROCK CONSTRUCTION ENTRANCE HAVING 1" TO 2" CLEAR ROCK OVER GEOTEXTILE FABRIC.
    D. STREET CLEANING AS MAY BE REQUIRED SHOULD VEHICLE TRACKING OCCUR.

    INDIVIDUAL SITE BUILDERS ARE REQUIRED TO MAINTAIN ECM'S UNTIL SUCH TIME AS INDIVIDUAL YARDS/VEGETATION ARE ESTABLISHED.
18. CONTRACTOR SHALL PROVIDE A TEMPORARY SEDIMENTATION BASIN ON SITE FOR CONSTRUCTION WASH OUT USE. TEMPORARY BASIN SHALL BE LOCATED AS TO PROVIDE EASY ACCESS FOR CONSTRUCTION VEHICLES AND CONCRETE TRUCKS AS NECESSARY.
19. INLET SEDIMENTATION CONTROL IS TO BE PROVIDED TO ALL STORM SEWER CATCH BASIN THROUGHOUT CONSTRUCTION . MEASURES APPLIED SHALL COMPLY WITH BEST MANAGEMENT PRACTICES FOR MINNESOTA AND APPLICATION OF NPDES PHASE II AS APPROPRIATE FOR PHASE OF CONSTRUCTION.
20. CONTRACTOR SHALL PREVENT SOIL LOSS DURING CONSTRUCTION DUE TO WIND EROSION THROUGHOUT CONSTRUCTION. DUST SHALL BE SUPPRESSED THOUGH THE APPLICATIONS OF WATER, AS DEEMED NECESSARY BY THE CONTRACTOR, OR THROUGH EQUIVALENT BMP'S AS APPROVED BY THE ENGINEER.
21. IF LEED ACCREDITATION IS APPLICABLE, CONTRACTOR SHALL DOCUMENT THE IMPLEMENTATION OF THE EROSION AND SEDIMENTATION CONTROL PLAN THROUGH DATE-STAMPED PHOTOS AND INSPECTION LOGS / REPORTS. REPORTS SHALL INCLUDE AT A MINIMUM DESCRIPTION OF ALL EMPLOYED BMP'S (INCLUDING BOTH MEASURES TO PREVENT SOIL LOSS DUE TO RUNOFF AND SOIL LOSS DUE TO WIND EROSION), BMP'S DEEMED UNNECESSARY DUE TO SITE CONDITIONS, CORRECTIVE ACTIONS TAKEN IN RESPONSE TO PROBLEMS, AND ANY ADDITIONAL INFORMATION RELEVANT TO THE CONDITION OF THE EROSION AND SEDIMENT CONTROL PLAN AS IT WAS ESTABLISHED AT THE TIME OF CONSTRUCTION.

STORMWATER POLLUTION PREVENTION PLAN SCHEDULE OF INSTALLATION & MAINTENANCE			
ITEM	INSTALLATION	INSPECTION & MAINTENANCE	REMOVAL
SILT FENCE	PRIOR TO COMMENCEMENT OF EARTHWORK OPERATIONS.	INSPECT & MAINT. AFTER EACH RUN-OFF EVENT. REMOVE SEDIMENTS AS REQUIRED.	AFTER TRIBUTARY DRAINAGE AREA IS RESTORED.
ROCK CONST. ENTRANCE	PRIOR TO COMMENCEMENT OF EARTHWORK OPERATIONS.	INSPECT REGULARLY. MAINTAIN AS NEEDED.	PRIOR TO PAVING.
INLET PROTECTION	UPON INLET CONSTRUCTING	WHEN 1/3 CAPACITY OF BMP IS REACHED	AFTER TRIBUTARY AREAS ARE FULLY RESTORED

KEY NOTES

1. INSTALL AND MAINTAIN SILT FENCE PERIMETER SEDIMENT PROTECTION IN TURF AREAS. USE BIO-ROLLS AS NEEDED IN PAVED AREAS FOR PHASING PURPOSES. (3 / C5)
2. INSTALL AND MAINTAIN SEDIMENT PROTECTION. (2 / C5)
3. INSTALL TEMPORARY ROCK ENTRANCE AT ALL CONSTRUCTION INGRESS AND EGRESS LOCATIONS PRIOR TO EXCAVATION AND TO BE MAINTAINED THROUGHOUT THE ENTIRE CONSTRUCTION PROCESS. (1 / C5)
4. INSTALL SEDIMENT CONTROL LOG PER MNDOT SPECIFICATION SECTION 2573.

GENERAL NOTES

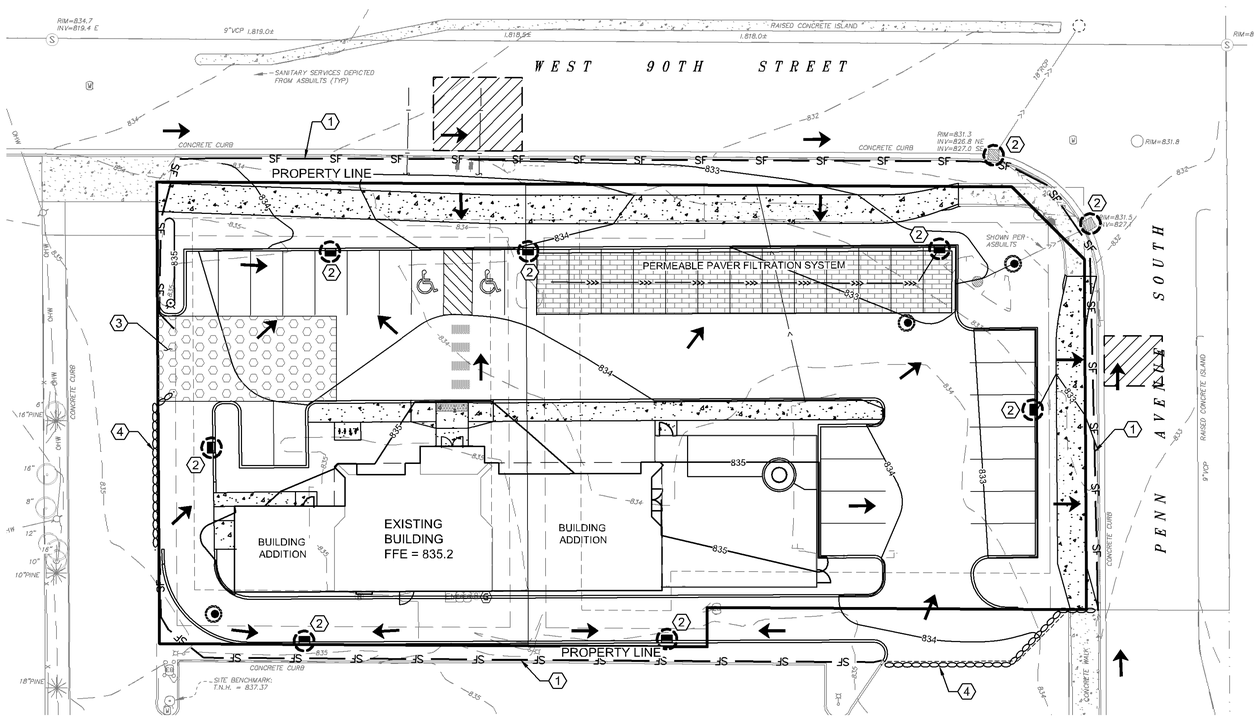
1. CONTRACTOR IS RESPONSIBLE FOR INSTALLATION, MAINTENANCE AND REMOVAL OF ALL APPLICABLE EROSION & SEDIMENT CONTROL ITEMS.
2. SPECIFIED EROSION/SEDIMENT CONTROL MEASURES ARE THE MINIMUM. ADDITIONAL PRACTICES MAY BE REQUIRED DURING THE COURSE OF CONSTRUCTION.
3. THE TOTAL DISTURBED AREA IS EQUAL TO 0.80 ACRES. THIS IS BELOW THE 1.0 ACRE THRESHOLD, AND THEREFORE AN MPCA PERMIT IS NOT REQUIRED.

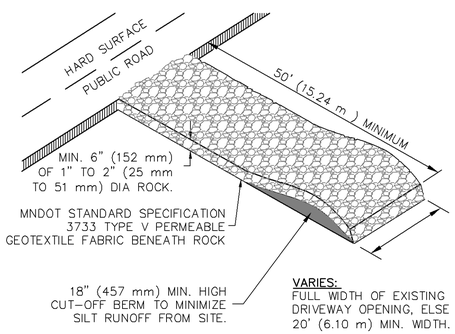
LEGEND

- PROPERTY LIMITS
- CONSTRUCTION LIMITS
- 956 EXISTING MINOR CONTOUR
- 955 EXISTING MAJOR CONTOUR
- 966 PROPOSED MINOR CONTOUR
- 965 PROPOSED MAJOR CONTOUR
- DRAINAGE ARROW
- SF SILT FENCE
- INLET SEDIMENT PROTECTION
- ROCK CONSTRUCTION ENTRANCE

N

0 20' 40'





1 ROCK CONSTRUCTION ENTRANCE DETAIL
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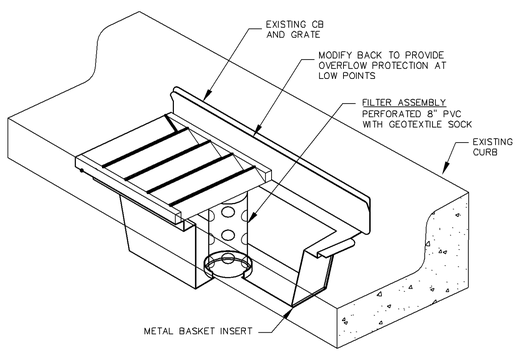
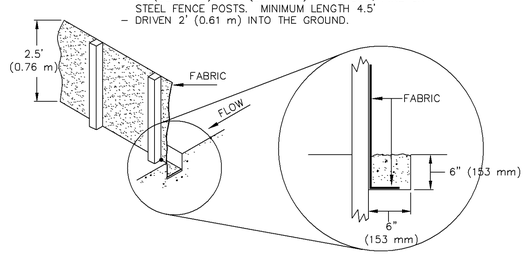


2 INLET PROTECTION DETAIL
SCALE: N.T.S.

NOTES:
- PLACE BOTTOM EDGE OF FENCE INTO 6" (153 mm) DEEP TRENCH AND BACKFILLED IMMEDIATELY.
- POSTS SHALL BE:
  - 4' (1.22 m) ON CENTER
  - 2" (50.8 mm) X 2" (50.8 mm) HARDWOOD, PINE OR STEEL FENCE POSTS. MINIMUM LENGTH 4.5'
  - DRIVEN 2' (0.61 m) INTO THE GROUND.



3 SILT FENCE INSTALLATION DETAIL
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HTG architects
www.htg-architects.com
Minneapolis Tampa Bismarck
9300 Hennepin Town Road
Minneapolis, MN 55347
Tel: 952.278.8880
Fax: 952.278.8822

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56013 09/27/2022
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ANDERSON
13605 1st Avenue N. #100
Plymouth, MN 55441 | ae-mn.com
P 763.412.4000 | F 763.412.4090
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EROSION & SEDIMENT CONTROL PLAN

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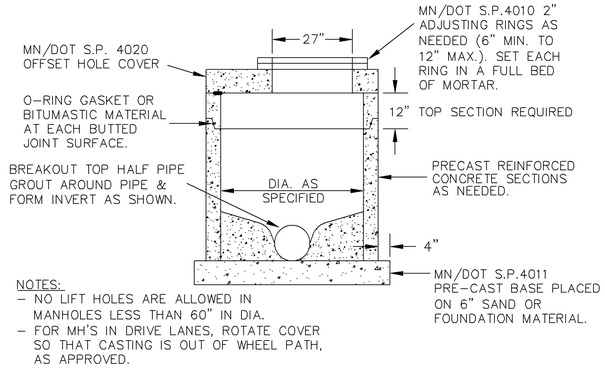

1 STANDARD MANHOLE DETAIL
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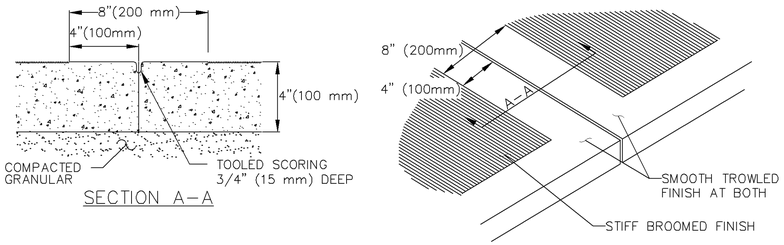

2 CONCRETE WALK SECTION DETAIL
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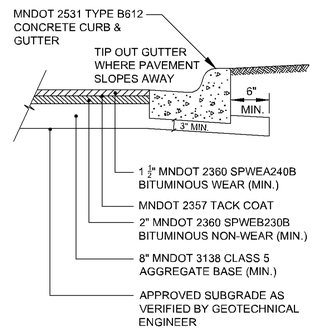

3 BITUMINOUS PAVEMENT SECTION
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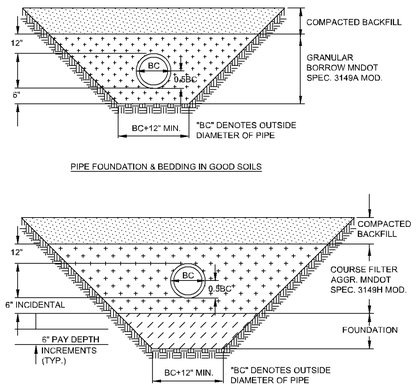

4 PVC OR HDPE PIPE BEDDING
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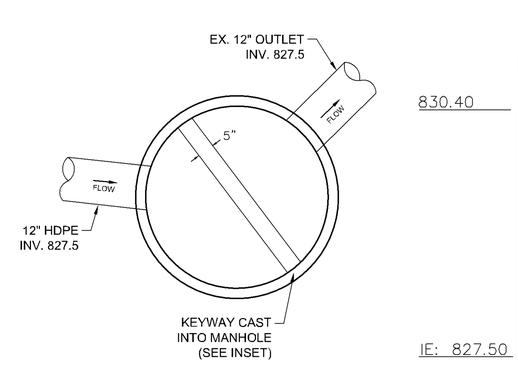
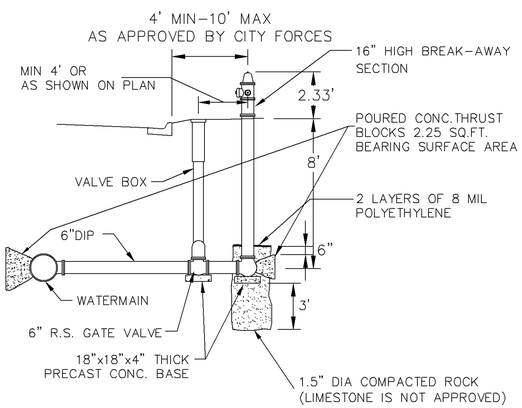


5 OUTLET CONTROL STRUCTER - 1 DETAIL
SCALE: N.T.S.

- HYDRANT TO BE:
  - WATEROUS PACER CLASSIC.
  - MUELLER SUPERCENTURION 250 MODEL A-423.
  - OR APPROVED EQUAL.
- EQUIP WITH THREE HOSE NOZZLES/CONNECTIONS AS FOLLOWS:
  - ONE – FACTORY INSTALLED 5 INCH STORZ-TYPE, QUARTER TURN PUMPER NOZZLE/CONNECTOR, INCLUDING A MANUFACTURER SUPPLIED AND INSTALLED ANODIZED ALUMINUM NOZZLE CAP WITH A 1.5 INCH PENTAGON NUT AND NO ROCKER LUG.
  - TWO – 2.5 INCH HOSE NOZZLES/CONNECTIONS (WITH NATIONAL STANDARD THREADS) AND STANDARD NOZZLE CAPS WITH 1.5 INCH PENTAGON NUTS, AND NO ROCKER LUGS.
- USE SS NUTS AND BOLTS AS APPROVED BY THE ENGINEER.
- ALL EXPOSED WATERMAIN SHALL BE WRAPPED WITH POLYETHYLENE IN ACCORDANCE WITH AWWA C-105.
- BARREL TO BE BRIGHT RED.
- ALL VALVES TO OPEN COUNTER-CLOCKWISE.
- SEE TYPICAL VALVE INSTALLATION DETAIL FOR VALVE DETAILS.
- WATEROUS PACER CLASSIC HYDRANTS SHALL INCLUDE INSTALLATION OF THE MANUFACTURERS MOST CURRENT ANTI-CHATTER BRASS UPPER VALVE WASHER.



10 HYDRANT INSTALLATION DETAIL
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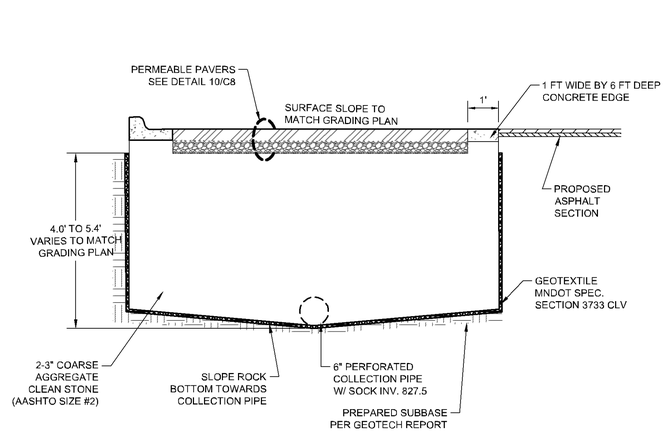

7 PERMEABLE INFILTRATION SECTION
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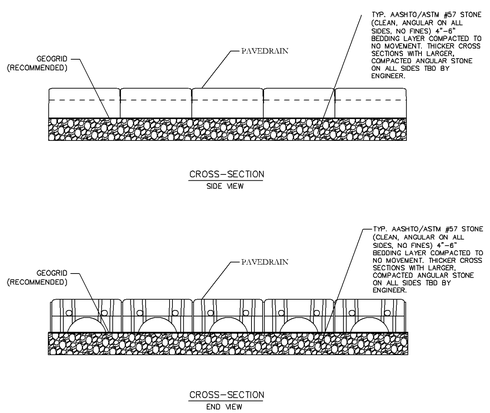

8 PERMEABLE PAVER SECTION
SCALE: N.T.S.

INSTALLATION NOTES

1. **EXISTING SUBGRADE UNDER BED AREAS SHALL NOT BE SUBJECT TO EXCESSIVE CONSTRUCTION EQUIPMENT TRAFFIC PRIOR TO GEOTEXTILE AND STONE BED PLACEMENT.**
2. **BRING SUBGRADE OF STONE INFILTRATION BED TO LINE, GRADE, AND ELEVATION INDICATED. FILL AND LIGHTLY REGRADE ANY AREAS DAMAGED BY EROSION, PONDING, OR TRAFFIC COMPACTION BEFORE PLACING OF STONE. TRANSVERSE SUBGRADE SLOPE TO BE 1.0% MIN, SEE GRADING PLAN FOR LONGITUDINAL SUBGRADE SLOPE.**
3. **PLACE GEOTEXTILE IN ACCORDANCE WITH MANUFACTURER'S STANDARDS AND RECOMMENDATIONS. ADJACENT TRIPS OF GEOTEXTILE SHALL OVERLAP A MINIMUM OF 16-INCHES. SECURE GEOTEXTILE AT LEAST FOUR (4) FEET OUTSIDE OF BED AND TAKE ANY STEPS NECESSARY TO PREVENT ANY RUNOFF OR SEDIMENT FROM ENTERING THE STORAGE BED.**
4. **INSTALL COURSE AGGREGATE IN 8-INCH MAXIMUM LIFTS. LIFTS OF 12-INCHES ARE ALLOWED OVER PIPE TO PREVENT DAMAGE. LIGHTLY COMPACT EACH LAYER WITH EQUIPMENT, KEEPING EQUIPMENT MOVEMENT OVER STORAGE BED SUBGRADES TO A MINIMUM. INSTALL AGGREGATE TO GRADES INDICATED ON DRAWINGS.**
5. **INSTALL STABILIZER BASE COURSE AGGREGATE EVENLY OVER SURFACE OF STONE BED, SUFFICIENT TO ALLOW PLACEMENT OF PAVEMENT, AND NOTIFY ENGINEER FOR APPROVAL.**
6. **FOLLOWING PLACEMENT OF BED AGGREGATE, THE GEOTEXTILE SHALL BE FOLDED BACK ALONG ALL BED EDGES TO PROTECT FROM SEDIMENT WASHOUT ALONG BED EDGES. AT LEAST A FOUR (4) FOOT EDGE STRIP SHALL BE USED TO PROTECT BEDS FROM ADJACENT BARE SOIL. THIS EDGE STRIP SHALL REMAIN IN PLACE UNTIL ALL BARE SOILS CONTIGUOUS TO BEDS ARE STABILIZED AND VEGETATED. IN ADDITION, TAKE ANY OTHER NECESSARY STEPS TO PREVENT SEDIMENT FROM WASHING INTO BEDS DURING SITE DEVELOPMENT. WHEN THE SITE IS FULLY STABILIZED, TEMPORARY SEDIMENT CONTROL DEVICES SHALL BE REMOVED.**

9 PERMEABLE PAVER NOTES
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HTG architects
www.htg-architects.com
Minneapolis Tampa Bismarck
9300 Hennepin Town Road
Minneapolis, MN 55347
Tel: 952.278.8880
Fax: 952.278.8822

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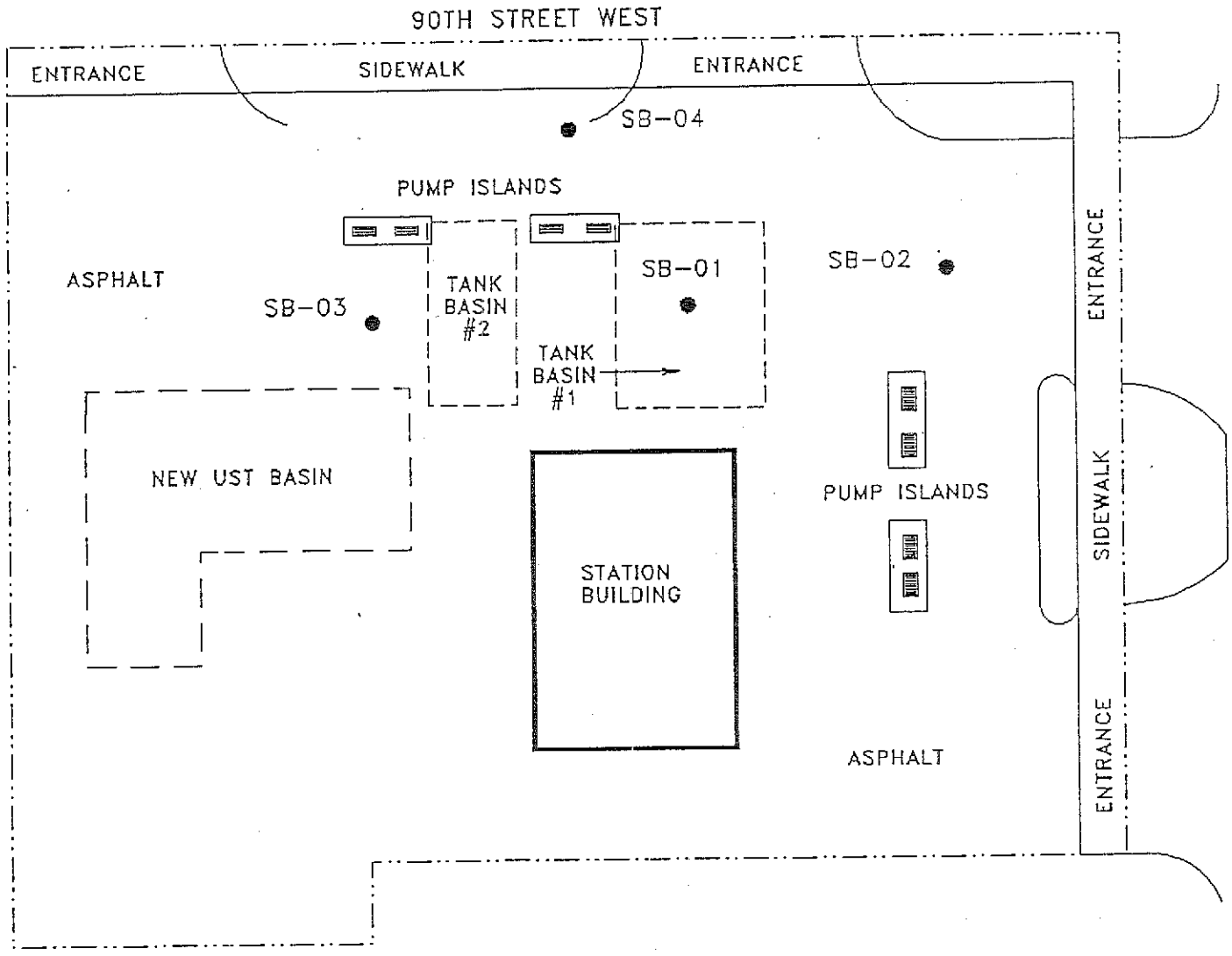
C6

16318 (AEMN)



G - HISTORICAL BORINGS

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FIGURE 4
SOIL BORING LOCATIONS
TOTAL SERVICE STATION
9000 PENN AVE. SO., BLOOMINGTON, MN

PROJECT NO.	DATE	SCALE	PREPARED BY	REVIEWED BY	DATE	REVISION	
719-012	5/91	1" = 20'	EFW		6/91	ORIGINAL	SB

PL20220183

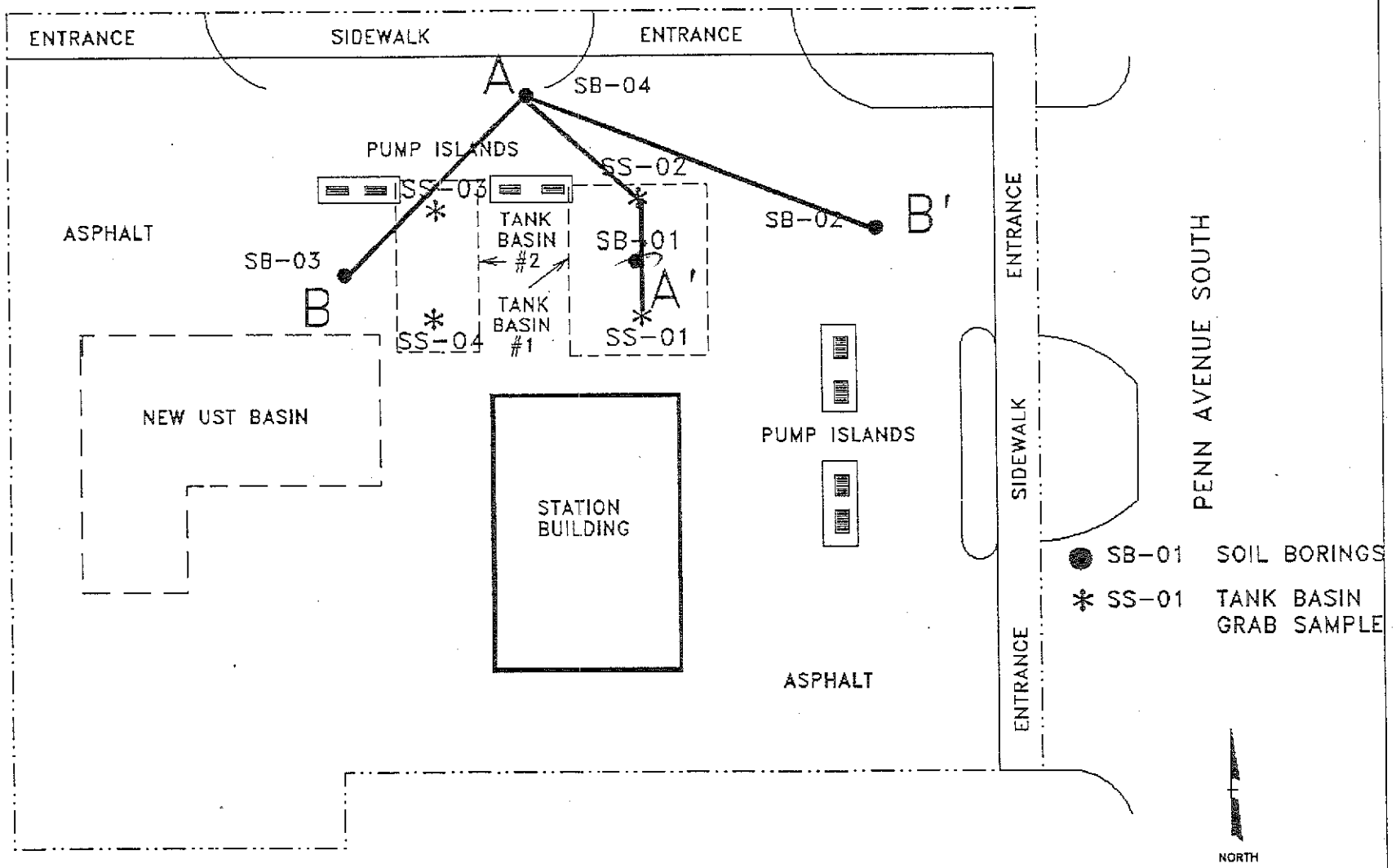

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FIGURE 5
GEOLOGIC CROSS SECTIONS A-A' & B-B'
TOTAL SERVICE STATION
9000 PENN AVE. SO., BLOOMINGTON, MN

PROJECT NO.	DATE	SCALE	PREPARED BY	REVIEWED BY	DATE	REVISION	
719-012	5/91	1" = 20'	EFW	JFS	6/91	ORIGINAL	CS

PL20220183

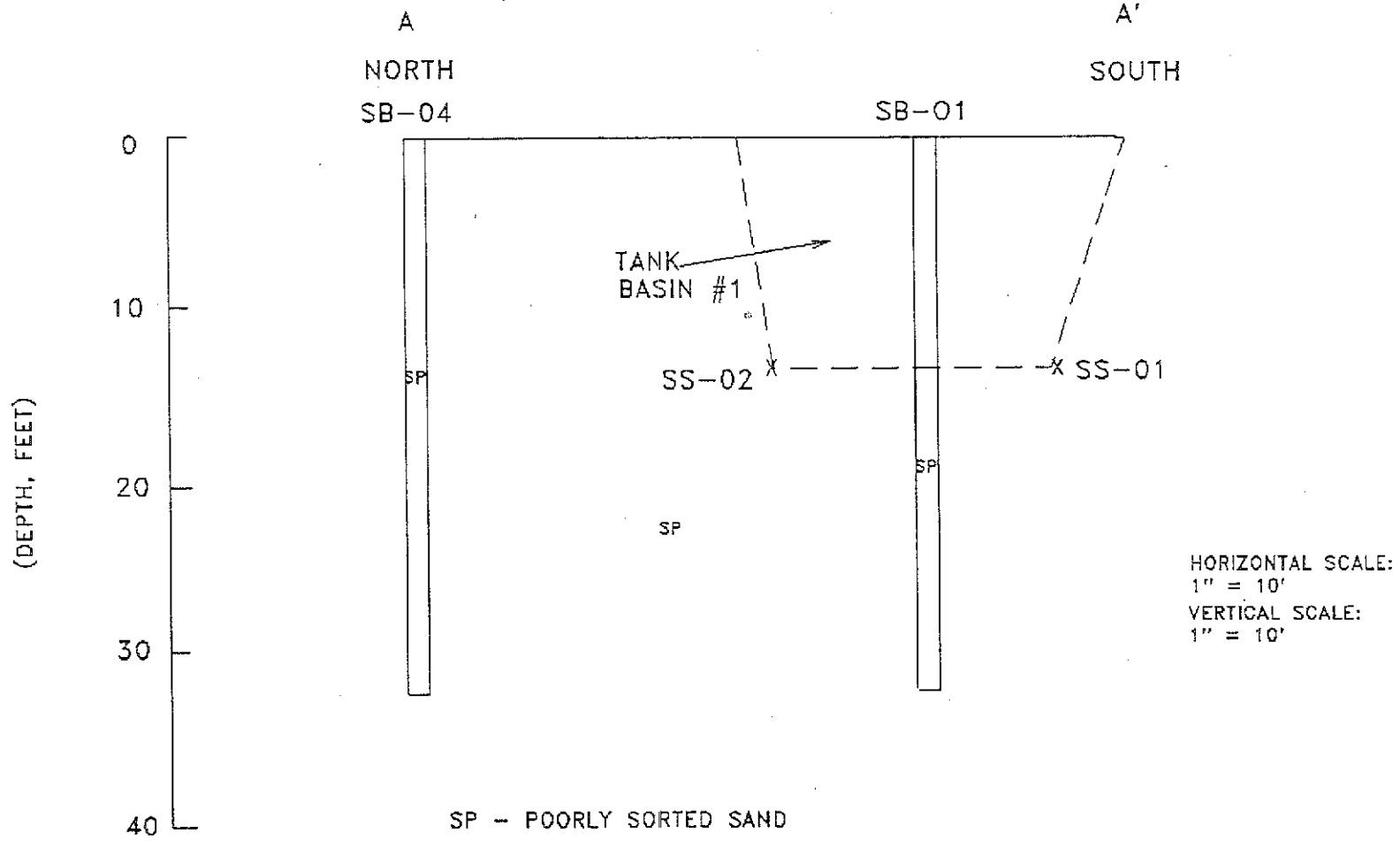

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FIGURE 6
GEOLOGIC CROSS SECTION A-A'
TOTAL SERVICE STATION
9000 PENN AVENUE SOUTH, BLOOMINGTON, MINNESOTA

PROJECT NO.	DATE	SCALE	PREPARED BY	REVIEWED BY	DATE	REVISION	
719-012	5/91	SEE DRAWING	EFW	JTS	7/5/	ORIGINAL	C1

PL20220183

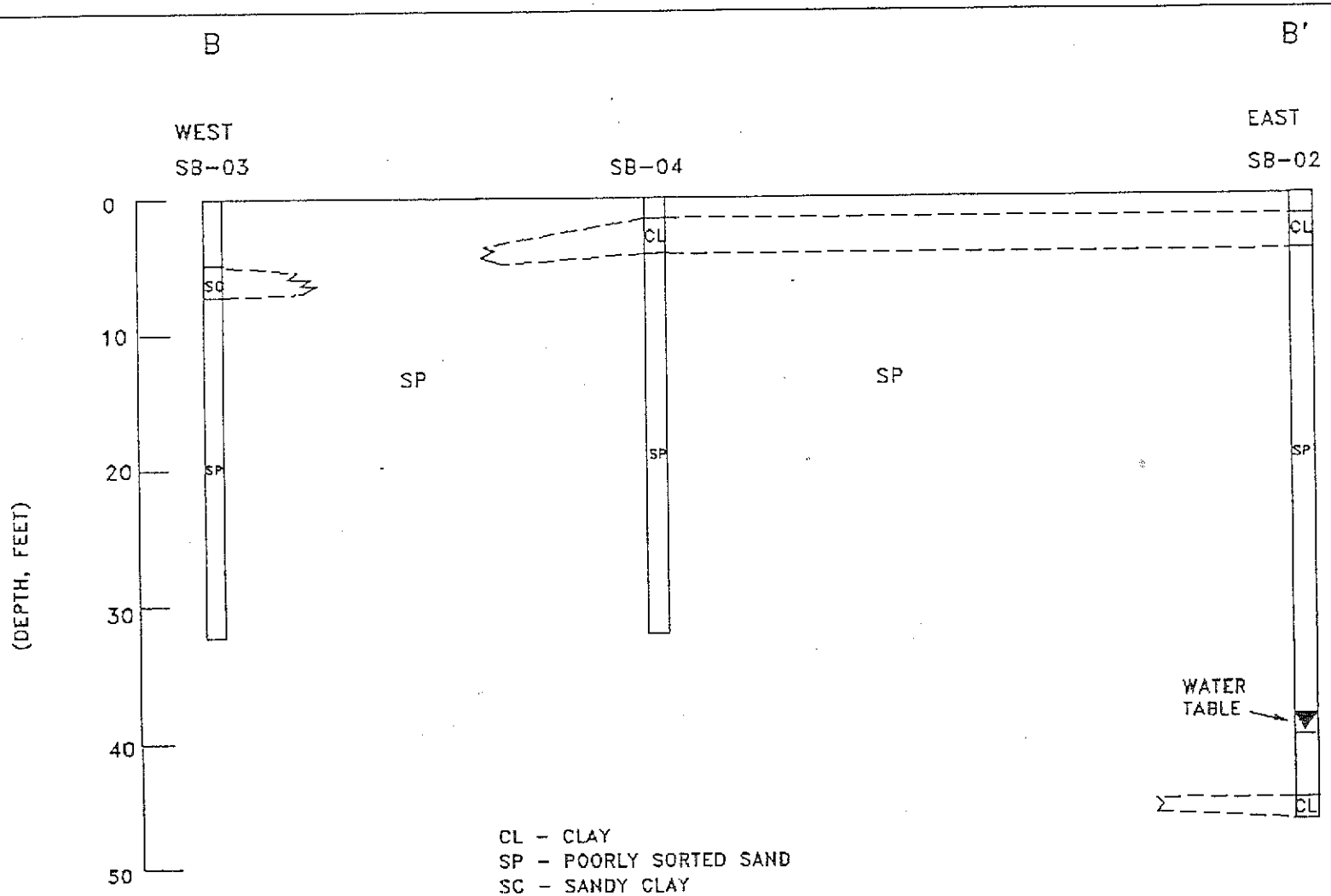

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FIGURE 7
GEOLOGIC CROSS SECTION B-B'
TOTAL SERVICE STATION
9000 PENN AVENUE SOUTH, BLOOMINGTON, MN

PROJECT NO.	DATE	SCALE	PREPARED BY	REVIEWED BY	DATE	REVISION	
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PL20220183

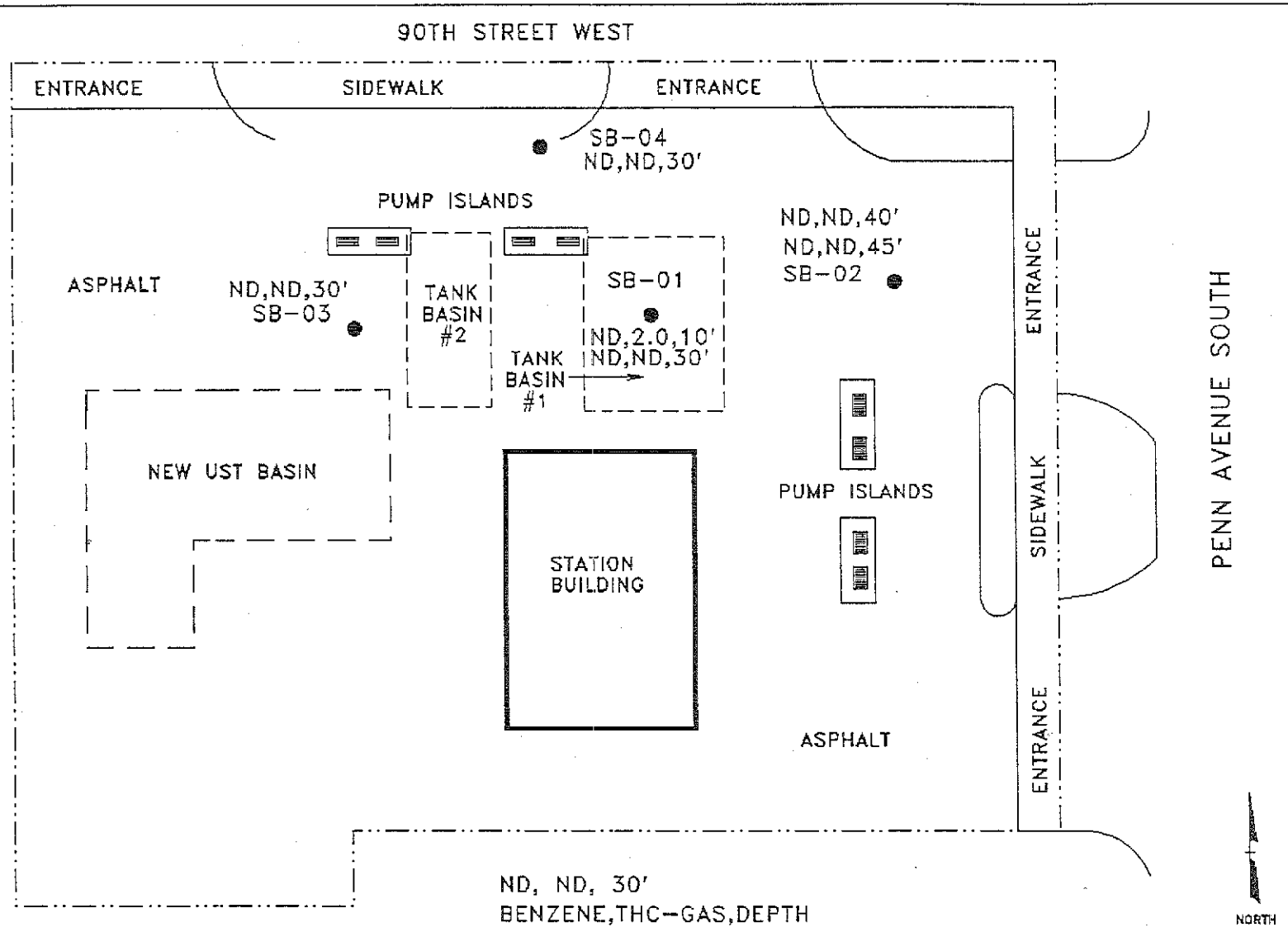

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FIGURE 8
SOIL ANALTYICAL DATA
TOTAL SERVICE STATION
9000 PENN AVE. SO., BLOOMINGTON, MN

PROJECT NO.	DATE	SCALE	PREPARED BY	REVIEWED BY	DATE	REVISION	
719-012	5/91	1" = 20'	EFW	JFS	7/91	ORIGINAL	J1

PL20220183

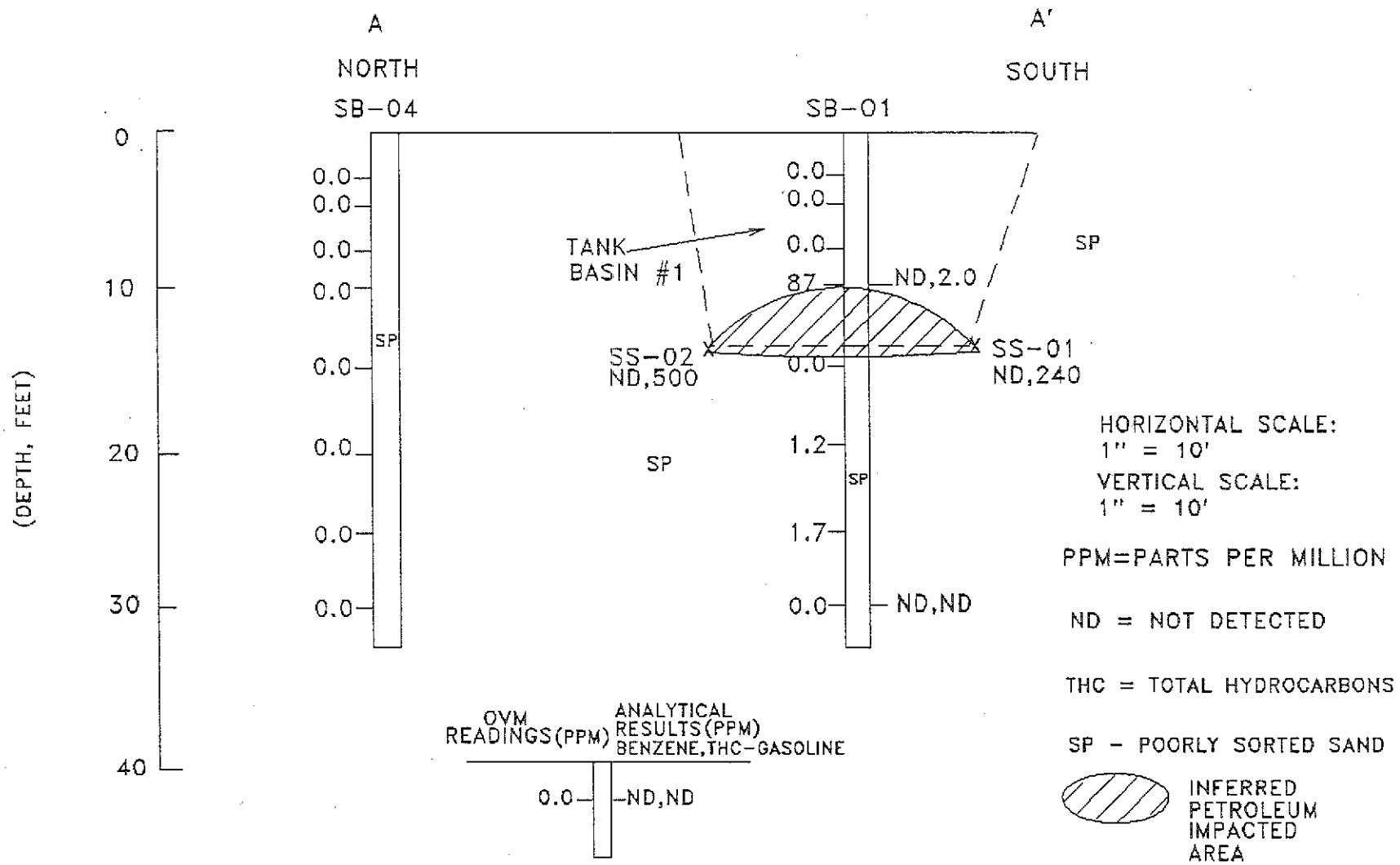

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FIGURE 9
GEOLOGIC CROSS SECTION A-A' AND SOIL ANALYTICAL RESULTS
TOTAL SERVICE STATION
9000 PENN AVENUE SOUTH, BLOOMINGTON, MINNESOTA

PROJECT NO.	DATE	SCALE	PREPARED BY	REVIEWED BY	DATE	REVISION	
719-012	5/91	SEE DRAWING	EFW			ORIGINAL	C3

PL20220183

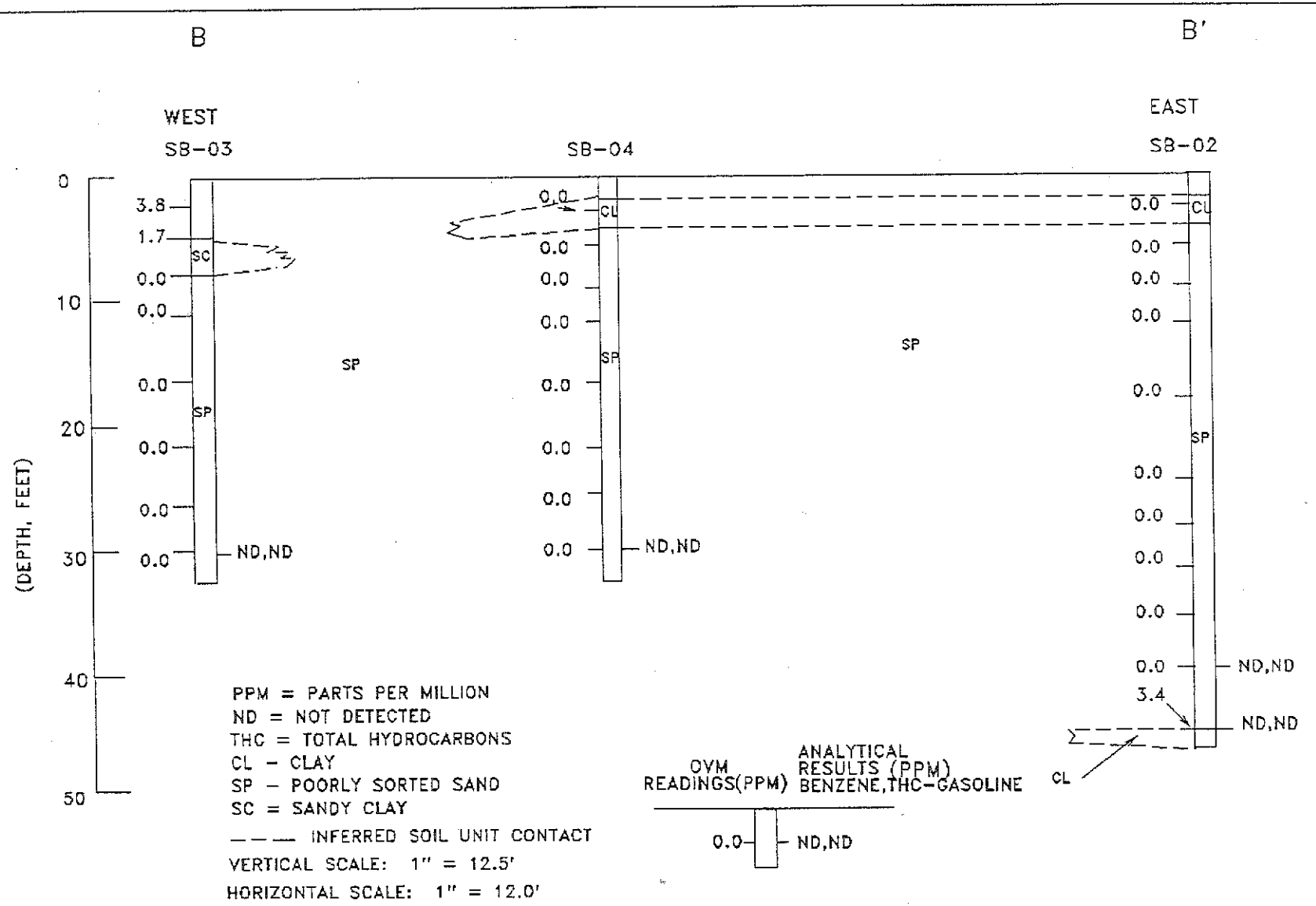

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FIGURE 10
GEOLOGIC CROSS SECTION B-B' AND SOIL ANALYTICAL RESULTS
TOTAL SERVICE STATION
9000 PENN AVENUE SOUTH, BLOOMINGTON, MN

PROJECT NO.	DATE	SCALE	PREPARED BY	REVIEWED BY	DATE	REVISION	
719-012	6/91	SEE DRAWING	SHW REV: EFW	JFS	7/91	ORIGINAL	C2

PL20220183

REMEDIAL INVESTIGATION
REPORT
TOTAL PETROLEUM INC
JULY 12, 1991

HENNEPIN COUNTY LEAK 3106
BLOOMINGTON
TOTAL PETROLEUM
9000 PENN AVENUE S.

THIS FILE HAS BEEN CHECKED FOR
NOT PUBLIC INFORMATION
ON 5-1992 BY SHF
(DATED) (INITIALS)

Kim Boland

BOX #179028184

STA

File
LEAK
Regu

PL202200183

H - LUST CLOSURE LETTER

Minnesota Pollution Control Agency
520 Lafayette Road, Saint Paul, Minnesota 55155-3898
Telephone (612) 296-6300

September 9, 1991

Mr. Mike Brown
1 Denver Place
999 18th Street
Suite 2201
P.O. Box 500
Denver, Colorado 80201

Dear Mr. Brown:

RE: Petroleum Tank Release Site Closure
Site: Total Petroleum Station, 9000 Penn Avenue South, Bloomington
Site ID#: LEAK00003106

The Minnesota Pollution Control Agency (MPCA) staff has determined that the cleanup performed in response to the petroleum tank release at the site referenced above has adequately addressed the petroleum contamination, and therefore the file regarding this release will be closed.

On August 22, 1990, a petroleum tank release was reported to the MPCA. Since then you have taken the following corrective actions in response to the release:

1. Three petroleum underground storage tanks (USTs) were removed from the site.
   - one 10,000 gallon unleaded gasoline UST.
   - one 6,000 gallon unleaded gasoline UST.
   - one 6,000 gallon regular leaded gasoline UST.

2. Approximately 228 cubic yards of petroleum contaminated soil was removed from the site. Soils were treated by CleanSoils, Incorporated and used as road base. Contamination remains on-site at low levels.

3. Four soil borings were completed to further define the extent and magnitude of soil and/or ground water contamination. Laboratory analysis of a soil sample taken from a boring, completed through the former tank basin, detected low levels of contamination (87 parts per million) at 10 to 12 feet. A sample from the base of the borehole did not detect hydrocarbon contamination.

4. Laboratory analysis of soil samples taken at the water table (40 feet) did not detect hydrocarbon contamination above the method detection limit of 1.2 parts per million, total hydrocarbons as gasoline.

Based on the currently available information, we believe these actions have adequately addressed the petroleum tank release. Therefore, MPCA staff does not intend to require any more investigation or cleanup work in response to this release. However, the MPCA reserves the right to reopen this file and require additional work if in the future more work is determined to be necessary, and this letter does not release any party from liability for this contamination.

Because you performed the requested work, the state may reimburse you for a major portion of your costs. The Petroleum Tank Release Cleanup Act establishes a fund which in certain circumstances provides partial reimbursement for petroleum tank release cleanup costs. This fund is administered by the Petroleum Tank Release Compensation Board (Petro Board). More specific eligibility rules are available from the Petro Board (612/297-4017).

Thank you for your cooperation with the MPCA in responding to this petroleum tank release to protect the public health and the environment of the state of Minnesota. If you have any questions regarding this correspondence, please call me at 612/297-8611.

Sincerely,

Mark E. Koplitz

Mark Koplitz
Pollution Control Specialist
Tanks and Spills Section
Hazardous Waste Division

MK:np

cc: Ulyssus Seal, Fire Chief, Bloomington
E.L. Woulfe, City Clerk, Bloomington
Greg Lie, Hennepin County Solid Waste Officer, Minneapolis
Jim Simonet, EnecoTech Environmental Consultants, Inc., Bloomington

PL202200183
MEK
9-13

CleanSoils Inc. 84 2nd Avenue S.E., New Brighton, MN 55112 • (612) 639-8811 • FAX (612) 639-8813

October 24, 1990

Mr. Mike Brown
1 Denver Place
999 18th Street
Suite 2201
P.O. Box 500
Denver, Colorado 80201

Dear Mr. Brown:

RE: Final Report on Soil Treatment and Notification of Post-Burn Sampling Results

Site: 900 Penn Avenue South, Bloomington, MN
MPCA Leak ID#: LEAK00003106
CleanSoils Project #: 90.143

CleanSoils has successfully completed the thermal treatment of petroleum contaminated soil from the above referenced site. The treated soil meets all MPCA requirements. Attached please find a copy of independent post-burn soil analyses for BTEX and TPH. Below is other information regarding the soil treated.

Quantity of Soil: 276.24 tons 386.764
Completion Date: October 15, 1990
Post-Burn Samples: 90.143-1
Final Disposition of Soil: Roadbase

If you should have any questions regarding this project, please contact me at (612) 639-8811.

Sincerely,

David H. Kress

David H. Kress
Project Manager

attachments

pc: File
Bob Dullinger, MPCA
Consultant

PL202200183

REMEDIAL INVESTIGATION REPORT
TOTAL PETROLEUM INC.
9000 PENN AVENUE SOUTH
BLOOMINGTON, MINNESOTA

Prepared For:

TOTAL PETROLEUM INC.
999 18th Street
Suite 2201
Denver, Colorado 80202

Prepared By:

ENECOTECH MIDWEST, INC.
3050 Metro Drive, Suite 115
Bloomington, Minnesota 55425

July 12, 1991

PROJECT NO: 719-012

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ENVIRONMENTAL CONSULTANTS

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B	Contaminated Soil Disposal Information
C	Soil Boring Logs
D	Chain of Custody
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1.0 INTRODUCTION

1.1 Purpose

EnecoTech Midwest, Inc. (EnecoTech) was retained by Total Petroleum, Inc. (Total) to perform a remedial investigation at the Total retail service station located at 9000 Penn Avenue South, Bloomington, Minnesota. The investigation was in response to data collected by EnecoTech during underground storage tank (UST) removal activities conducted on October 3, 1990. The data indicated that site soils had been impacted by a petroleum hydrocarbon release. The purpose of the investigation was to:

- Determine the nature, extent and magnitude of hydrocarbon release(s) to site soils; and
- Provide options and recommendations for remediation of hydrocarbon impacts, if necessary.

1.2 Scope–of–Work

An investigation scope–of–work for the site was developed and implemented by EnecoTech with the approval of Total. The scope–of–work involved the characterization of site geology, hydrogeology, soil quality, and potential hydrocarbon sources. Characterization of these items was accomplished by:

- Drilling four (4) soil borings,
- Logging geologic materials encountered in the borings,
- Monitoring soil gas vapors with an OVM Systems photo–ionizer (OVM),
- Collecting soil samples for laboratory analyses,

1.3 Previous Reports

A Minnesota Pollution Control Agency (MPCA) "Excavation Report for Petroleum Release Sites" for the subject location (Appendix A) summarized tank excavation activities performed at the site on October 3, 1990. A summary of this report is provided below:

- One (1) 6,000 gallon regular gasoline UST and one (1) 6,000 gallon unleaded gasoline UST were excavated and removed from Tank Basin #1 at the subject location. In addition, one (1) 10,000 gallon unleaded gasoline UST was excavated and removed from Tank Basin #2.
- Some corrosion was noted but no holes in the tanks were visible.
- Soils in the tank pit consisted of sandy clay.
- Ground water was not encountered during the UST excavations
- Bedrock was not encountered during the UST excavations.

- Elevated OVM readings were measured in soils from beneath and adjacent to the USTs in both Tank Basin #1 and Tank Basin #2 (Figure 2 and 3, Appendix A). OVM readings ranged from 5.3 to 965 parts per million (ppm) in Tank Basin #1 and from 0 to 827 ppm in Tank Basin #2.

- Four (4) soil samples were collected from beneath the former UST locations. Total hydrocarbons (THC) as gasoline were detected in two (2) of the four (4) samples at concentration levels of 240 ppm and 500 ppm. Concentration levels of lead ranged from 2 to 23 ppm. However, none of the four (4) samples contained detectable concentration levels of benzene.

- A complete excavation of the petroleum impacted soil was not considered feasible due to the geotechnical instability of the unconsolidated sand and the potential for structural damage to existing above ground structures. Approximately, 228 cubic yards of gasoline impacted soil was removed and sent to a local soil incinerator with MPCA approval. All necessary information pertaining to the contaminated soil removal and disposal may be found in Appendix B.

2.0 BACKGROUND INFORMATION

2.1 Site Setting

The site is located at 9000 Penn Avenue South, Bloomington, Minnesota (Figure 1). At the time of the investigation, above ground structures included the station building and two pump islands located to the north and east of the station building (Figure 2). The below ground structures included one (1) 6,000 gallon regular gasoline steel UST, one (1) 6,000 gallon unleaded gasoline steel UST, and one (1) 10,000 gallon unleaded gasoline steel UST. These three USTs were located in the north central portion of the property. The area surrounding the site is occupied by an Amoco Service Station to the north; Wallys Restaurant to the east; a Burger King Restaurant to the south; and a ~~Dunkin Donut~~ Store to the west.

2.2 Site History

No information was available regarding the site history at the time of this report preparation.

2.3 Regional Geology

The geology of the region has been characterized from published Minnesota Geological Survey (MGS) information. Available information indicates that the region is underlain by Pleistocene age fluvial terrace deposits consisting of sand, gravely sand and silty sand. These glacial deposits range in thickness from approximately 100 to 200 feet (Bloomgren, 1979) and overlie bedrock composed of the Prairie du Chein group.

2.4 Regional Hydrogeology

The glacial deposits form an unconfined buried glacial aquifer. Regional groundwater flow direction for the unconfined buried glacial aquifer is to the southeast (Figure 3). Glacial deposits that underlie this portion of Bloomington yield moderate amounts of water to wells. The major bedrock aquifers in the region are the St. Peter, Prairie du Chien – Jordan and Mt. Simon–Hinkley Aquifers. These aquifers are approximately 100 to 800 feet below ground surface (bgs).

The St. Peter Sandstone yields 9 to 100 gallons per minute (gpm) and is primarily used for private domestic wells. The Prairie du Chien–Jordan and Mt. Simon Hinkley aquifer supply the majority of groundwater to the region. Yields range from 85 to 2,765 gpm (Norvitch, et.al., 1973).

3.0 SITE INVESTIGATION PROCEDURES

3.1 Soil Boring Placement

The locations of soil borings were based on data obtained from the original tank pit excavations and were positioned to delineate the stratigraphic and areal extent of potential hydrocarbon soil impacts (Figure 4).

3.2 Soil Boring Procedures

Soil boring activities were initiated on February 28, 1991. Thein Well Company of Shakopee, Minnesota performed drilling activities under EnecoTech supervision using a Mobile drill rig and hollow stem augers. Drilling equipment was cleaned by field personnel prior to the drilling of the first soil boring and after each soil boring completion. Cleaning was performed with a high pressure washer and potable water. An EnecoTech geologist monitored cleaning activities and inspected the augers to ensure decontamination had been achieved.

A total of four (4) soil borings were completed to depths of 32 to 47 feet below ground surface (bgs). The soil borings were drilled using a 6 3/4 inch O.D. hollow stem auger. The EnecoTech geologist logged each borehole by describing the geologic materials encountered in the subsurface (Appendix C).

3.3 Soil Sampling Procedures

Soil samples were collected with a split spoon sampler. Split spoons were decontaminated prior to sampling, using a detergent–distilled water–methanol–distilled water rinse cycle. Samples were collected at 5 feet intervals to the final bottom hole depth. Soil samples were screened with an OVM using the MPCA jar headspace analysis technique. The soil sample that contained the highest concentration levels of organic vapors, and the deepest soil sample, were placed in laboratory prepared containers. All samples were labeled, stored on ice, and shipped with a chain of custody form to the analytical laboratory (Appendix D). The soil samples were analyzed for benzene, toluene, ethyl benzene and xylene (BTEX), methyl teritary butyl ether (MTBE), and total hydrocarbons (THC) as gasoline. Analyses were completed using Environmental Protection Agency (EPA) Method 8020 for BTEX, and MTBE, EPA Method 6010 for lead, and EPA Method 8015 for THC–gasoline.

4.0 RESULTS AND DISCUSSION

4.1 Site Geology

The soil underlying the site has been characterized to a depth of 47 feet bgs by logging soil samples obtained from soil borings SB–01 through SB–04 (Appendix C). Geologic cross sections developed from these borings are shown in Figures 5, 6 and 7. The site is generally underlain by a medium grained sand which was logged to a depth of 32 feet bgs in soil borings SB–01, SB–03, SB–04, and to 46 feet bgs in soil boring SB–02. Soil borings SB–02 and SB–04 indicate a clay unit from 2.5 to 4.5 feet bgs. A stiff silty to sandy clay was encountered in soil borings SB–02 at 46 to 47.5 feet bgs (end of boring).

4.2 Site Hydrogeology

Ground water was encountered in only one soil boring, SB–02, at approximately 40 feet bgs. Saturated conditions in this boring were logged from 40 to 46 feet bgs. The saturated conditions were encountered in the sand unit. At 46 feet bgs a clay unit, which was at least 1.5 feet thick, was encountered. These conditions indicate that the clay unit, if continuous, may be acting as an aquitard.

4.3 Soil Quality

4.3.1 Soil Sample Organic Vapor Data

Organic vapor readings recorded during soil boring advancements may be found in Table 1. No significant organic vapors were detected in soil samples from soil borings SB–02, SB–03 and SB–04. A sample from soil boring SB–01 had an organic vapor reading of 87 ppm at 10 to 12 feet bgs. This sample corresponds to the bottom elevation of Tank Basin #1. Subsequent samples collected beneath the 10 to 12 feet bgs interval in soil boring SB–01, indicated either non–detectable or very minor (<2.0 ppm) organic vapor concentrations.

4.3.2 Soil Sample Laboratory Analytical Data

Soil samples were collected from the soil borings for laboratory analysis at depths ranging from 10 to 45 feet bgs (Table 2). Detectable concentrations of THC–gasoline at 2.0 ppm was found in soil sample SS–01–10. This concentration remains well below the MPCA regulatory action level of 50 ppm. Benzene was not detected in any of the soil samples analyzed. In addition, lead concentrations all remained within normal limits (1.3 to 9 ppm).

4.4 Hydrocarbon Distribution

The following discussion of the soil petroleum hydrocarbon distribution incorporates the data that was collected during the UST excavations as well as data collected during the soil boring investigation. The distribution of petroleum hydrocarbons in soil are shown in Figures 8, 9 and 10.

Limited soil impacts were encountered in the area of Tank Basins #1 and #2. The soil impacts associated with Tank Basin #1 are restricted to a thin layer of soil directly beneath the former UST location within that basin. These impacts were encountered in soil samples SS–1 and SS–2 collected from the base of the excavation after UST removal (Figure 9). Although both samples contained detectable concentration levels of THC–gasoline at 500 ppm and 240 ppm, respectively, they did not contain detectable concentration levels of benzene.

The soil impacts associated with Tank Basin #2 were restricted to the soil excavated during UST excavation activities. Soil samples SS–3 and SS–4, collected from the base of Tank Basin #2, did not display detectable concentration levels of soil organic vapors, BTEX or THC–gasoline (Appendix A).

Soil boring SB–01 was completed in the center of Tank Basin #1, to assess the vertical extent of impacts beneath Tank Basin #1. A soil sample collected from this boring at 10 to 12 feet bgs, displayed an organic vapor reading of 87 ppm and a laboratory concentration of 2.0 ppm THC–gasoline. However, from 12 to 32 feet bgs (bottom of boring) OVM readings ranged from non–detectable to 1.7 ppm. In addition, soil sample SB–01–30 had non–detectable concentrations for all hydrocarbon constituents analyzed. This data indicates that vertical migration of petroleum hydrocarbons below 12 feet bgs in soil boring SB–01 is extremely limited (Figure 9).

The western, northern, and eastern boundaries of Tank Basins #1 and #2 are defined by soil borings SB–03, SB–04, and SB–02. Generally, no detectable concentration levels of soil organic vapors, BTEX or THC–gasoline were detected in these borings to their bottom hole depths of 32, 32, and 47 feet bgs, respectively (Figure 8 and 10). An OVM reading of 3.4 ppm was recorded in soil boring SB–02 at a depth of 45–47 feet bgs. The cause for this reading is unknown given the non–detectable laboratory results discussed below.

Ground water was encountered at a depth of approximately 40 feet bgs in soil boring SB–02. Soil samples were collected immediately above the water table (SB–02–40) and within the saturated zone (SB–02–45). Both samples revealed non–detectable concentrations for all petroleum hydrocarbon constituents analyzed.

Interpretation of both the UST excavation data and soil boring data indicates that petroleum impacted soil is limited to a thin layer of sand at the base of former Tank Basin #1 (Figure 9).

5.0 SUMMARY

- On October 3, 1990, one (1) 6,000 gallon regular gasoline UST, one (1) 6,000 gallon unleaded gasoline UST, and one (1) 10,000 gallon unleaded gasoline UST were excavated at the subject location. Some corrosion was noted but no holes in the tanks were visible. Soil encountered in the two (2) tank basins consisted of sandy clay.

- Elevated OVM readings were recorded in the soil encountered during the UST's removal activities. OVM readings ranged from 0 to 965 ppm in the two (2) tank basins at depths of 4.5 to 13.5 feet bgs. THC–gasoline was detected in two (2) of the four (4) soil samples collected from the two (2) tank basins. Soil samples SS–01 and SS–02 had THC–gasoline concentration levels of 500 ppm and 240 ppm, respectively. These two (2) samples were collected from the base of Tank Basin #1. However, none of the four (4) soil samples contained detectable concentration levels of benzene.

- A complete excavation of the petroleum impacted soil was not considered feasible due to the geotechnical instability of the unconsolidated sand and the potential for structural damage to existing above ground structures. Approximately 228 cubic yards of hydrocarbon impacted soil was removed and sent to a local soil incinerator with MPCA approval (Appendix B).

- Soil boring activities were initiated and completed on February 28, 1991. A total of four (4) boreholes were completed to depths of 32 to 47 feet bgs. The soil borings were drilled using a 6 3/4 inch O.D. hollow stem auger. Sample collection was completed using split spoon samplers.

- No significant organic vapors were detected in soil boring samples collected from SB–02, SB–03 and SB–04. Soil boring SB–01 was the only soil boring which contained a significant vapor reading (87 ppm) at 10 to 12 feet bgs. From 12 to 32 feet bgs, organic vapors in soil samples from SB–01 ranged from non–detectable to 1.7 ppm (Table 1).

- Soil sample SB–1–10, collected at 10 feet bgs from soil boring SB–01, had a concentration of THC–gasoline of 2.0 ppm. However, all other soil boring samples analyzed from soil borings SB–01, SB–02, SB–03 and SB–04 contained non–detectable concentrations of benzene and THC–gasoline (Table 2).

- Groundwater was encountered at a depth of approximately 40 feet bgs in soil boring SB–02. Non–detectable laboratory results from soil samples SB–02–40 and SB–02–45, collected from the water table interface and in the saturated zone, respectively, indicate that ground water has not been impacted by petroleum hydrocarbons (Figure 10).

- All the available UST excavation and soil boring data indicates petroleum hydrocarbon impacted soil is limited to a thin layer of sand at the base of Tank Basin #1 (Figure 9).

6.0 CONCLUSIONS

The following conclusions are based upon field data generated during the UST excavation and subsequent RI.

- Excavation of impacted soils in Tank Basin #2 has remediated the Tank Basin #2 area. No hydrocarbon impacts were found in the soil samples analyzed from the base of Tank Basin #2.

- The data collected from the soil borings has determined the lateral and vertical extent of impacts. This data indicates that a limited gasoline release occurred in the area of Tank Basin #1. Only a residual layer of impacted soil remains near the bottom of Tank Basin #1 at 10 to 12 feet bgs. By advancing soil borings SB–01, SB–02, SB–03 and SB–04, it was determined that extremely limited lateral and vertical migration of hydrocarbons occurred in the vicinity of Tank Basin #1.

- The analytical data collected from the soil boring samples indicates that hydrocarbon impacts are minimal and remain well below MPCA regulatory action levels.

- Soil organic vapor readings and soil analytical data collected from soil boring SB–02 indicate that ground water was not impacted by hydrocarbons.

- The data indicates that excavation activities have sufficiently remediated the Tank Basin #1 area.

7.0 RECOMMENDATIONS

EnecoTech's recommendations are based on conditions at the site at the time of field investigations. These recommendations have been determined from the data that has been generated by tasks outlined in the scope–of–work.

The data indicates that no additional investigation or remediation is warranted. We therefore recommend site closure. This recommendation is based on the following specific data:

- Petroleum hydrocarbon impacts are limited to a very small area both horizontally and vertically.
- Soil boring data indicates soil excavation completed during UST removal has sufficiently remediated hydrocarbon impacts.
- The soil impacts detected during the RI are below MPCA regulatory action levels for soil remediation.
- Soil sample data indicates that the underlying surficial aquifer has not been impacted by the investigated release.

8.0 REFERENCES

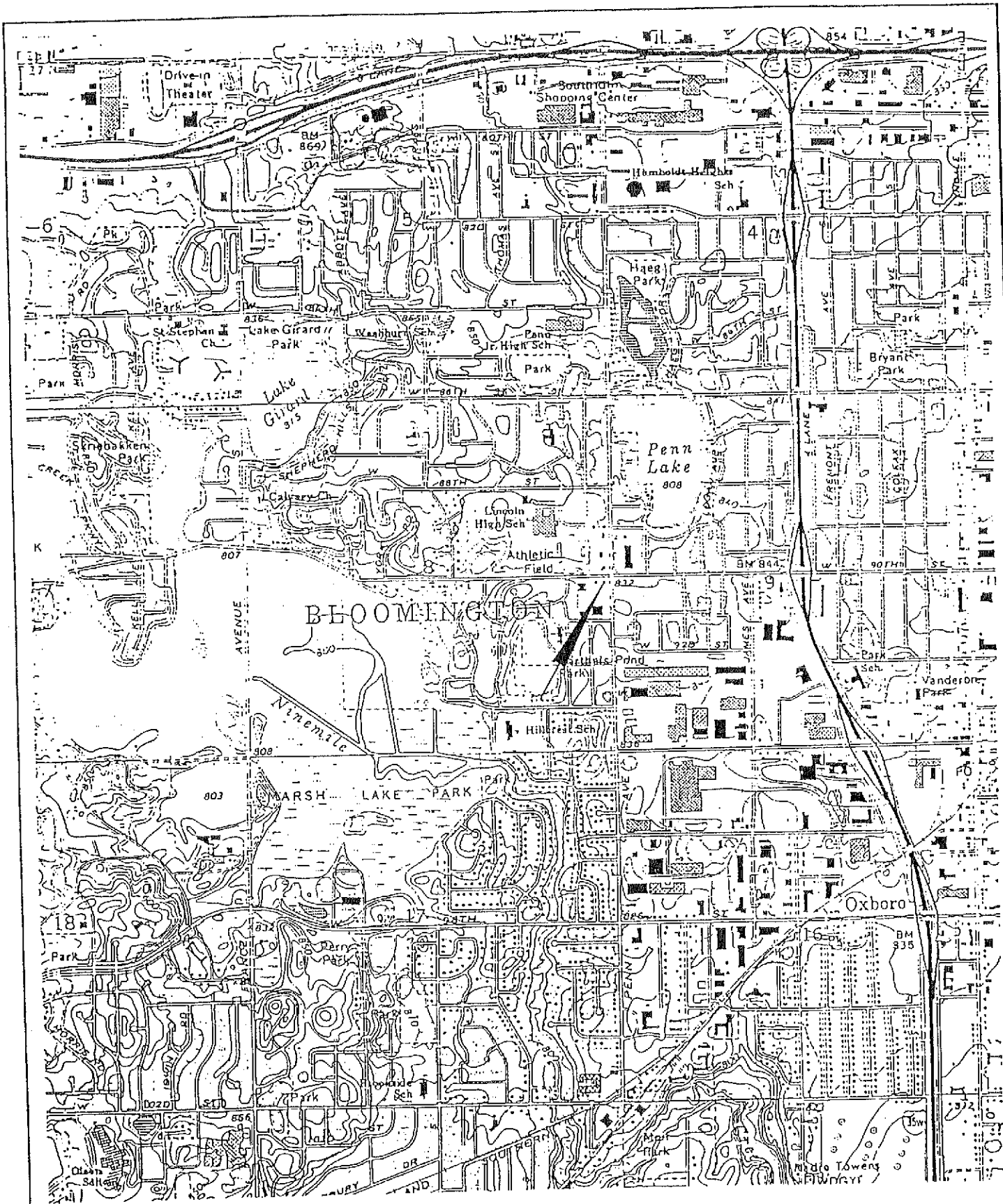
Balabon, N.H., 1989; Geologic Atlas, Hennepin County, Minnesota; County Atlas Series, Atlas C–4; Minnesota Geological Survey.

Bloomgren, B.A., Poppe, J.R., 1979 Geologic and Hydrologic Aspects of Tunneling in the Twin Cities Area, Minnesota: Minnesota Geological Survey.

Norvitch, R.F., Ross, T.G., and Brietkriotz, Alex, 1973 Water Resources Outlook for the Minneapolis–St. Paul Metropolitan Area, Minnesota: USGS

Minnesota Pollution Control Agency Guidelines, 1986. "Procedures for Groundwater Monitoring" MPCA Solid and Hazardous Waste Division Program Development Section.

FIGURES



ENECOTECH

BLOOMINGTON, MINNESOTA

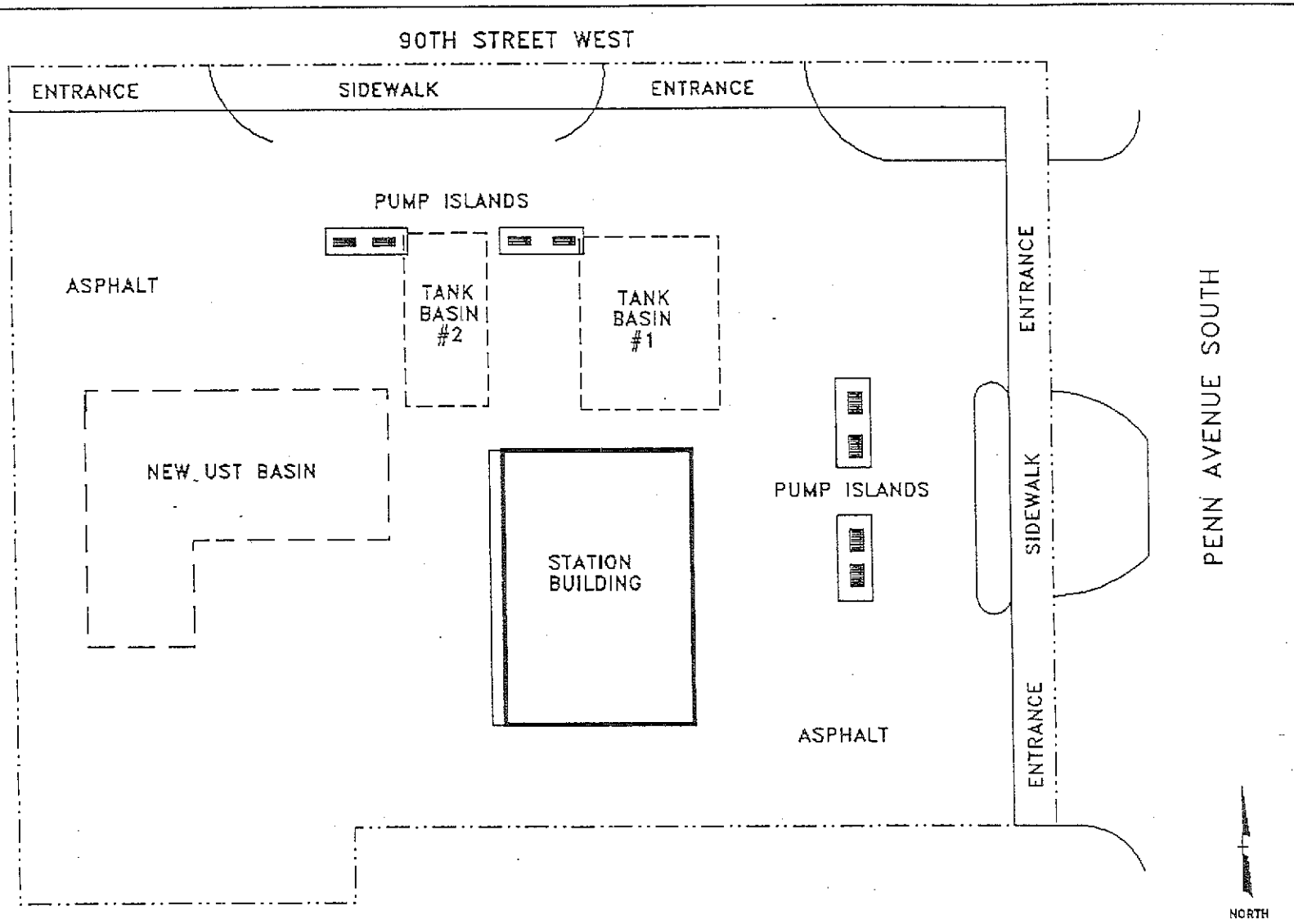
PROJECT TOTAL-PENN AVE. SOUTH

SITE LOCATION MAP
9000 PENN AVE. SOUTH
BLOOMINGTON, MINNESOTA

FILE NO.: 719-012

DATE: 5/91

FIGURE NO.: 1



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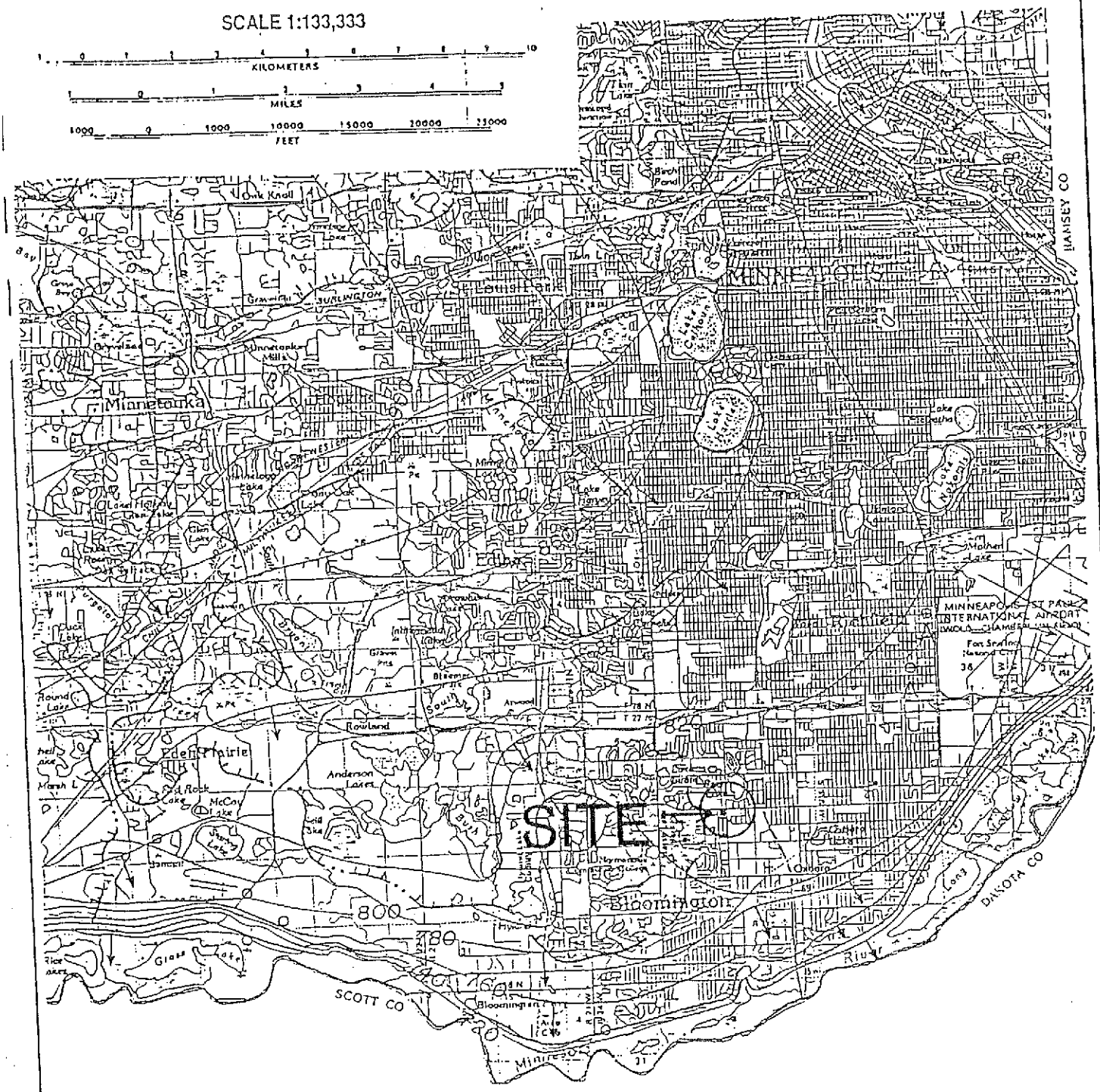
BLOOMINGTON, MINNESOTA

FIGURE 2
SITE MAP
TOTAL SERVICE STATION
9000 PENN AVE. SO., BLOOMINGTON, MN

PROJECT NO.	DATE	SCALE	PREPARED BY	REVIEWED BY	DATE	REVISION	
719-012	5/91	1" = 20'	EFW	JFS	5/91	ORIGINAL	S1

PL20220183



GEOLOGIC ATLAS OF HENNEPIN COUNTY, MINNESOTA

AFTER BALABON, 1989

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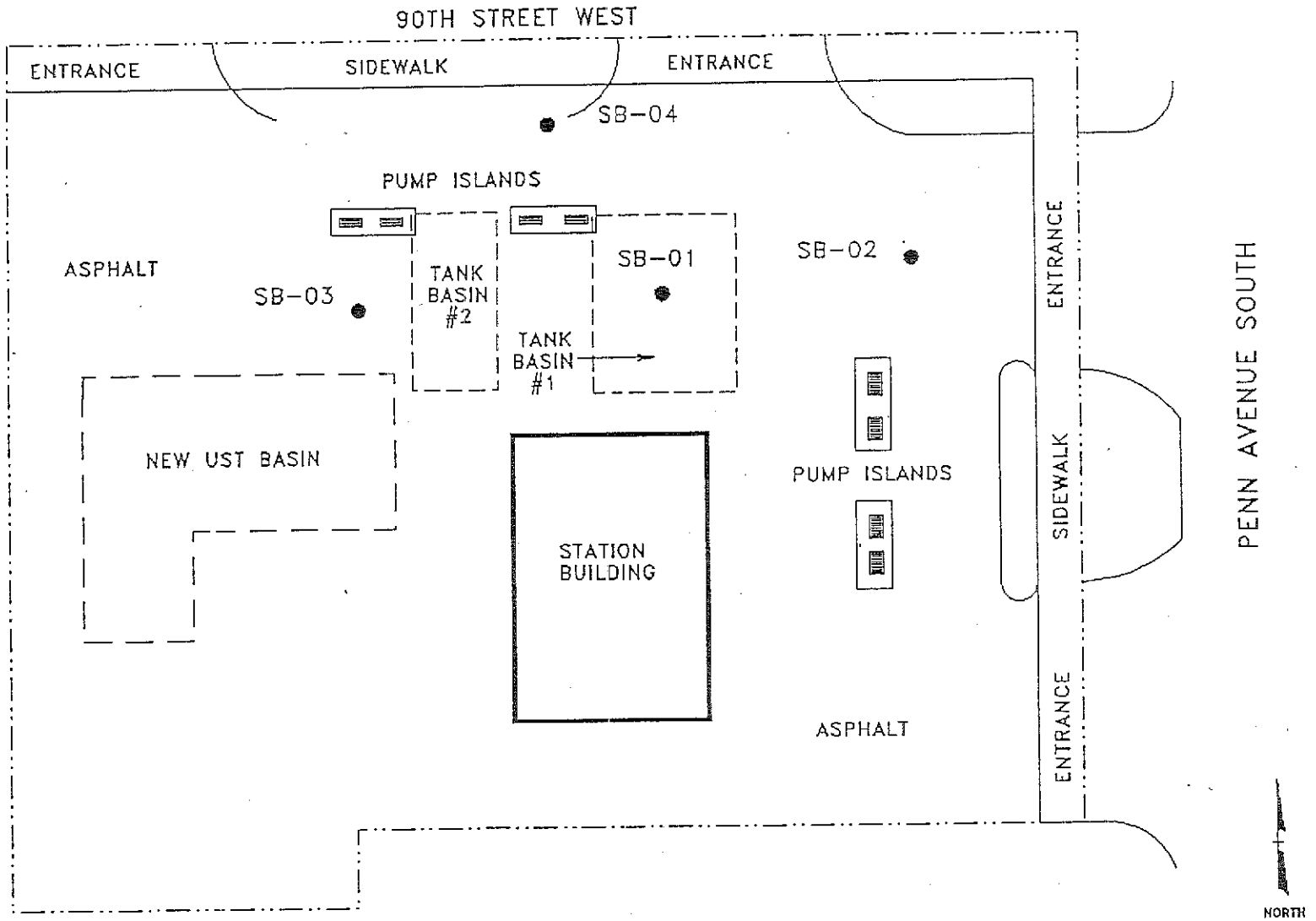
BLOOMINGTON, MINNESOTA

FIGURE 3
WATER TABLE/BURIED GLACIAL AQUIFER
TOTAL PETROLEUM SERVICE STATION
9000 PENN AVENUE SOUTH, BLOOMINGTON, MN

PROJECT NO.	DATE	SCALE	PREPARED BY	REVIEWED BY	DATE	REVISION	
708-007	5/91	1:133,000	GVA			ORIGINAL	--



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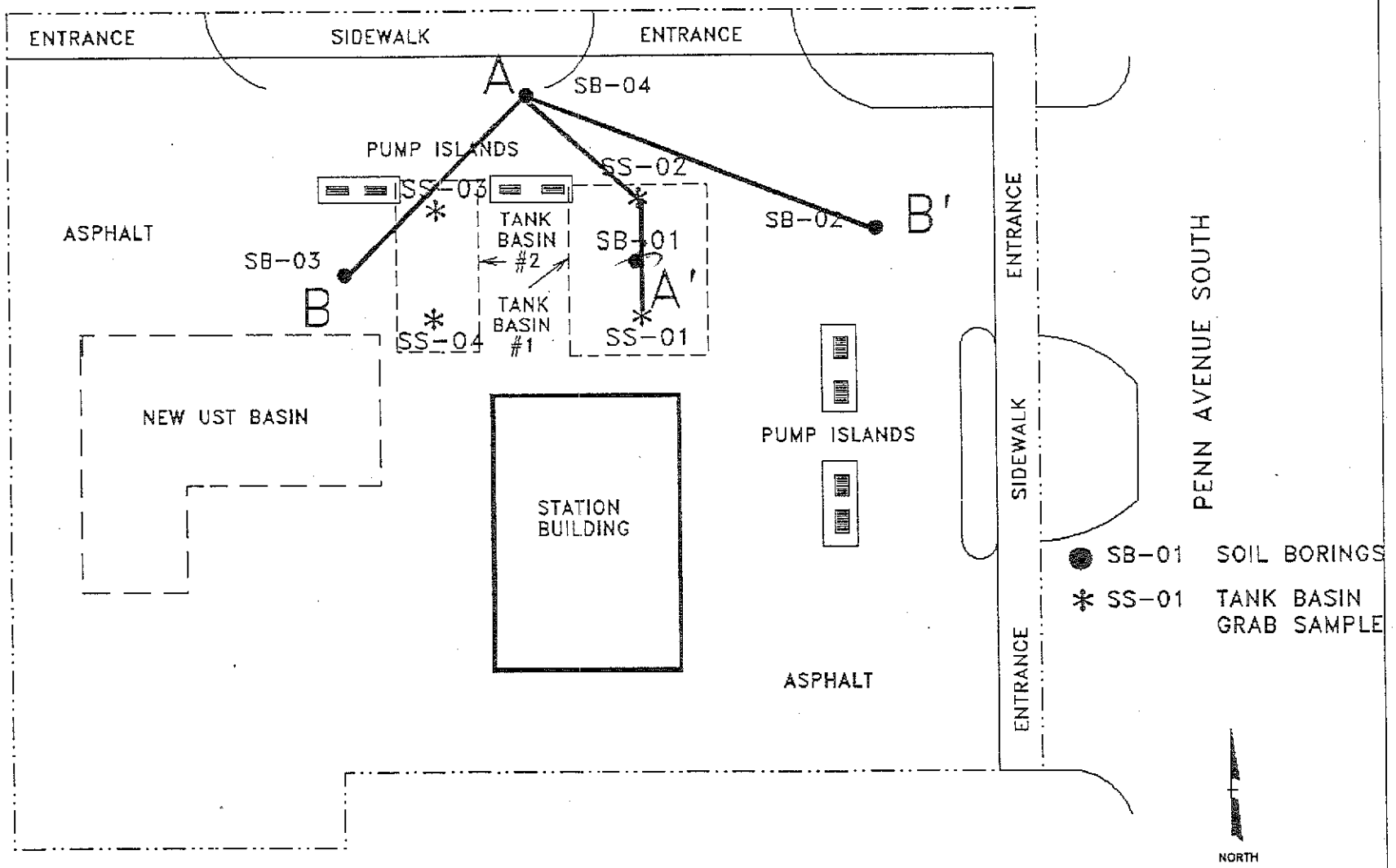
BLOOMINGTON, MINNESOTA

FIGURE 4
SOIL BORING LOCATIONS
TOTAL SERVICE STATION
9000 PENN AVE. SO., BLOOMINGTON, MN

PROJECT NO.	DATE	SCALE	PREPARED BY	REVIEWED BY	DATE	REVISION	
719-012	5/91	1" = 20'	EFW		6/91	ORIGINAL	SB

PL20220183



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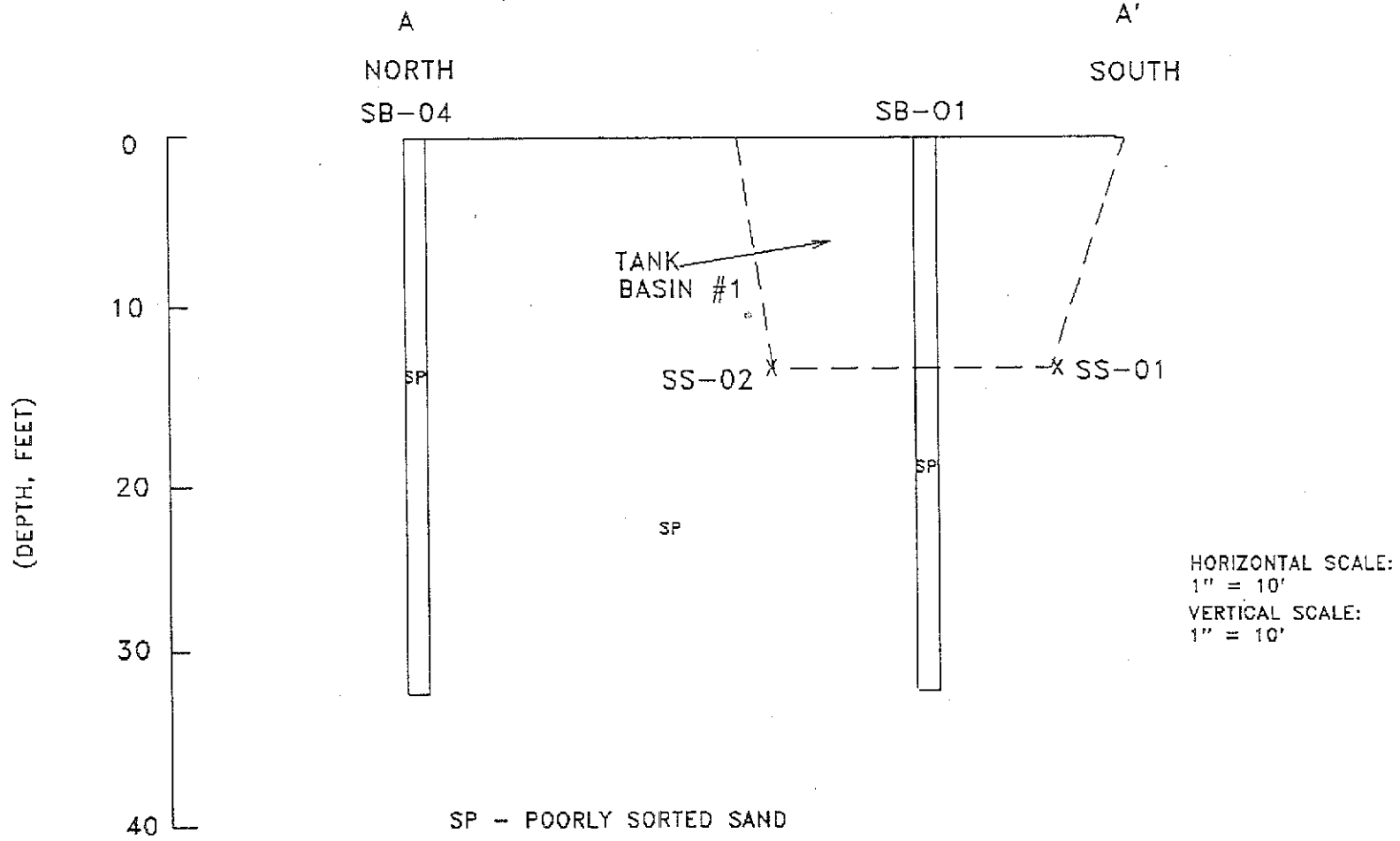
BLOOMINGTON, MINNESOTA

FIGURE 5
GEOLOGIC CROSS SECTIONS A-A' & B-B'
TOTAL SERVICE STATION
9000 PENN AVE. SO., BLOOMINGTON, MN

PROJECT NO.	DATE	SCALE	PREPARED BY	REVIEWED BY	DATE	REVISION	
719-012	5/91	1" = 20'	EFW	JFS	6/91	ORIGINAL	CS

PL20220183



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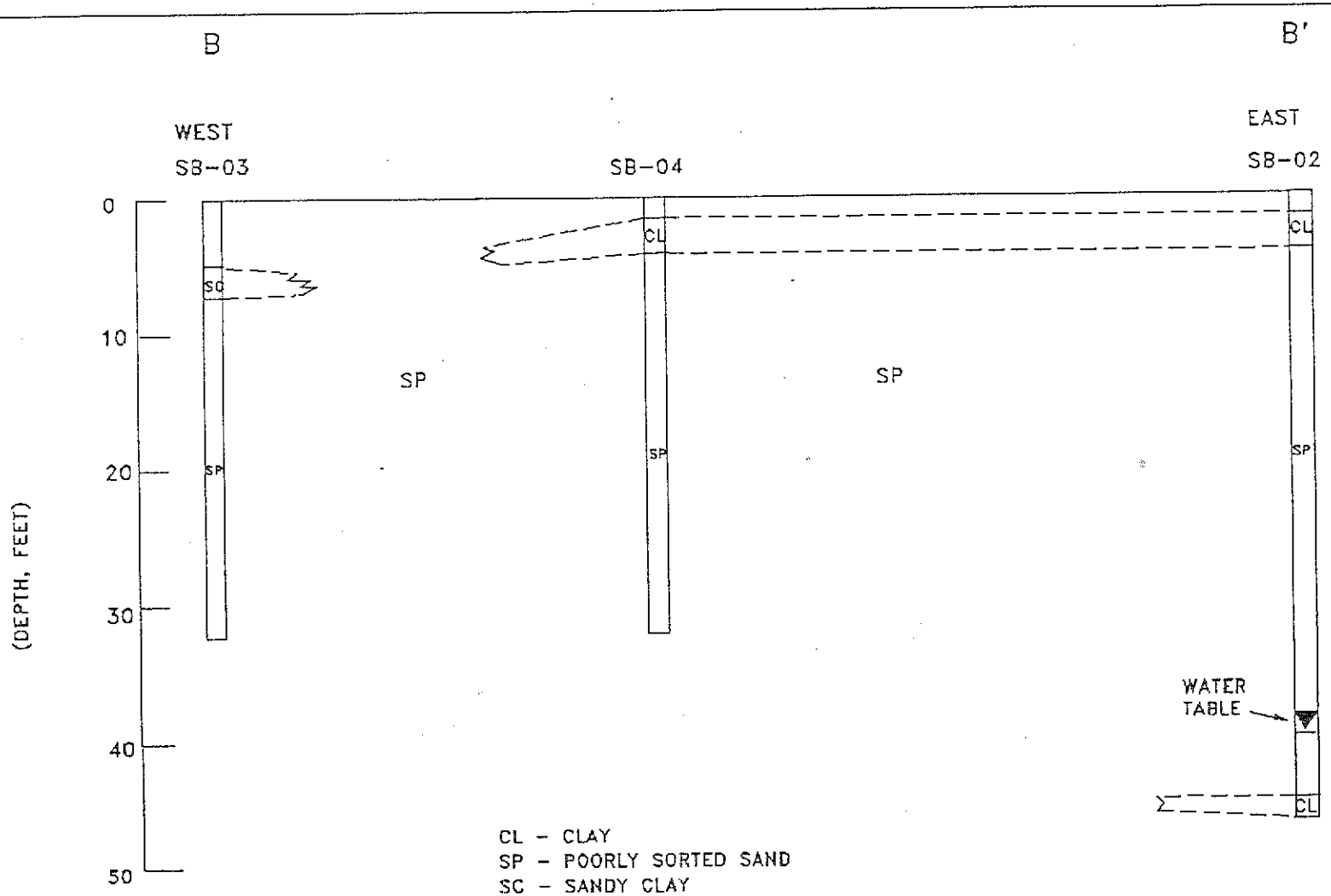
BLOOMINGTON, MINNESOTA

FIGURE 6
GEOLOGIC CROSS SECTION A-A'
TOTAL SERVICE STATION
9000 PENN AVENUE SOUTH, BLOOMINGTON, MINNESOTA

PROJECT NO.	DATE	SCALE	PREPARED BY	REVIEWED BY	DATE	REVISION	
719-012	5/91	SEE DRAWING	EFW	JTS	7/5/	ORIGINAL	C1

PL20220183



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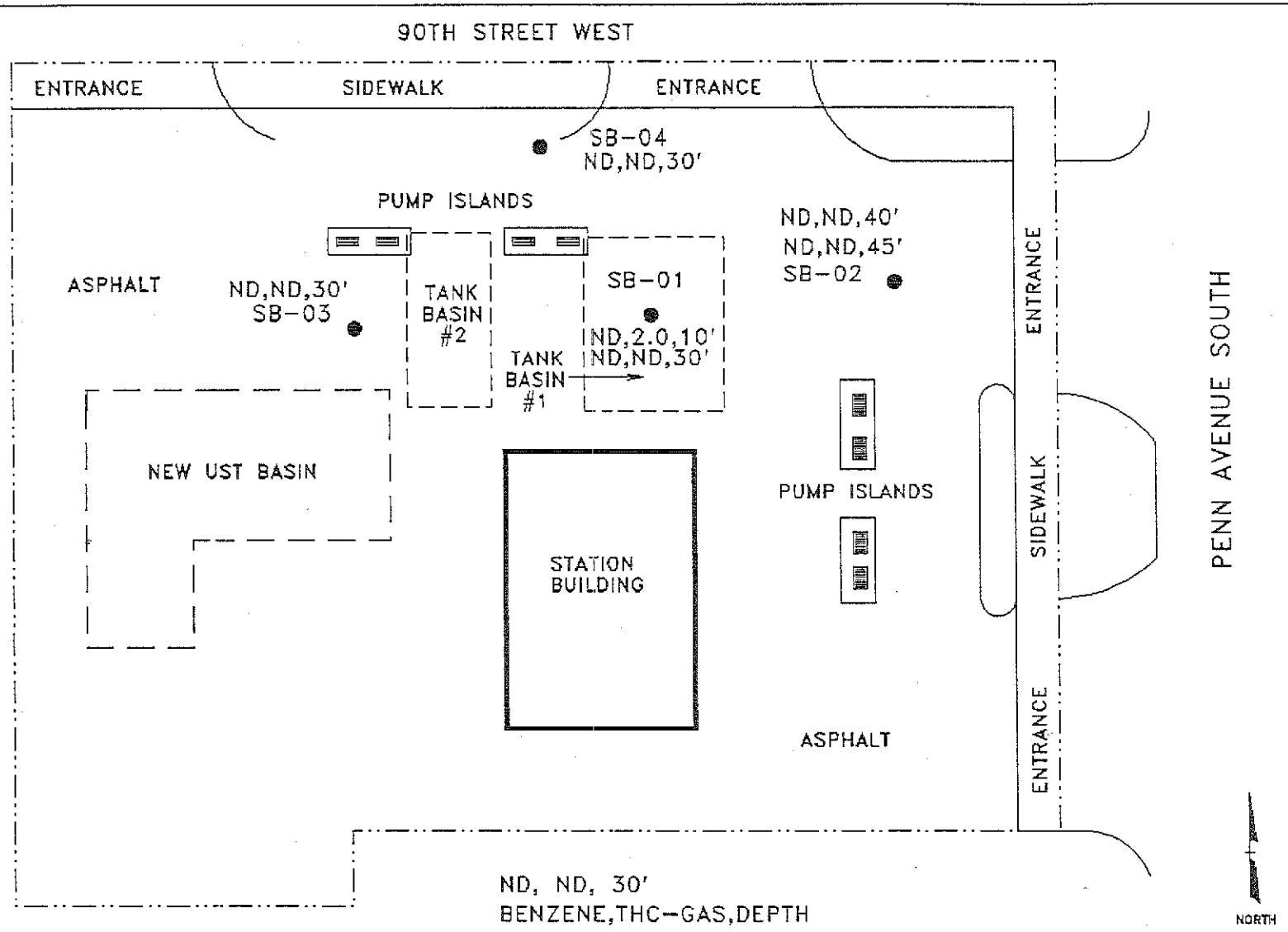
BLOOMINGTON, MINNESOTA

FIGURE 7
GEOLOGIC CROSS SECTION B-B'
TOTAL SERVICE STATION
9000 PENN AVENUE SOUTH, BLOOMINGTON, MN

PROJECT NO.	DATE	SCALE	PREPARED BY	REVIEWED BY	DATE	REVISION	
719-012	6/91	SEE DRAWING	SHW REV: EFW	JFS	7/91	ORIGINAL	C4

PL20220183



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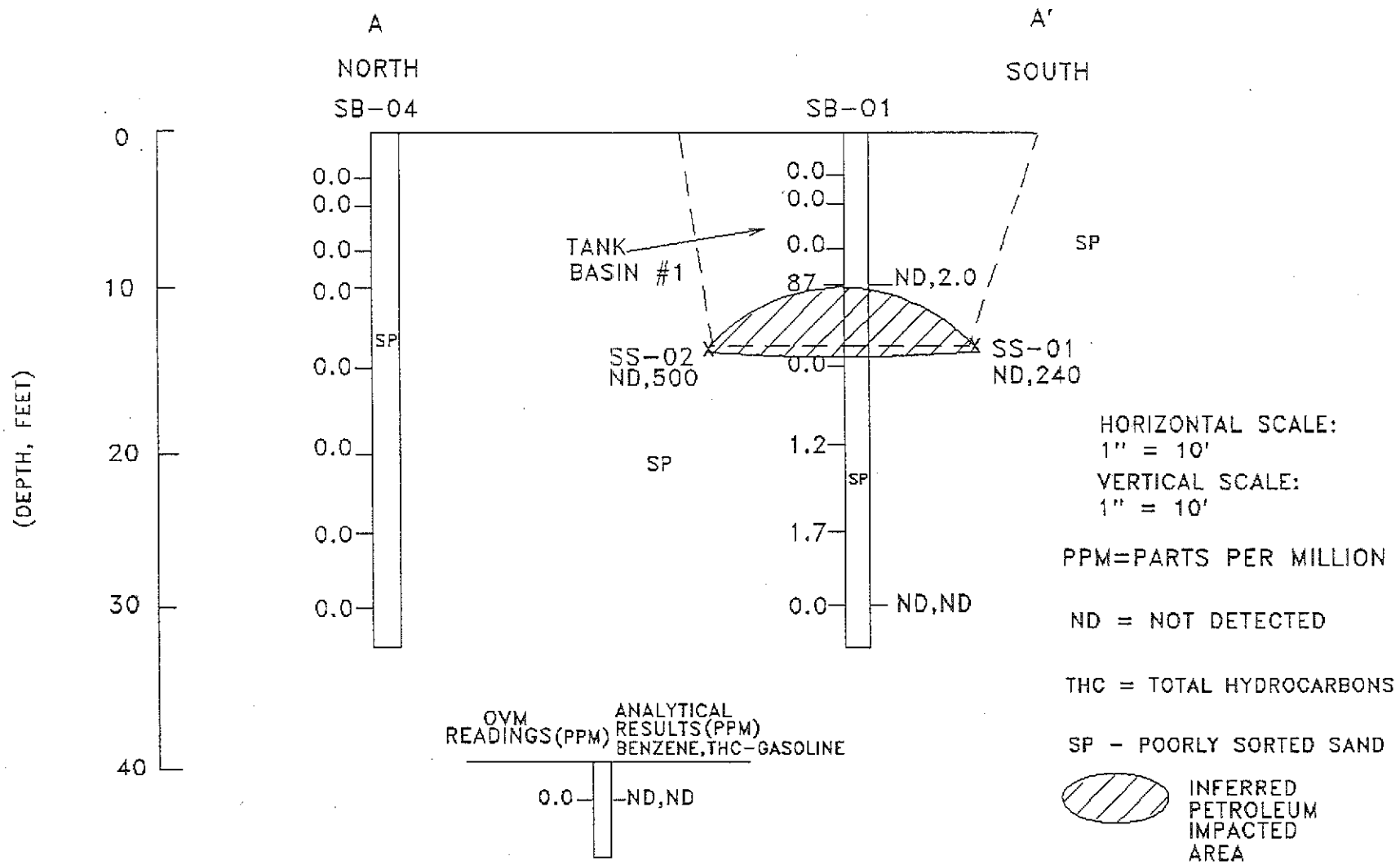
BLOOMINGTON, MINNESOTA

FIGURE 8
SOIL ANALTYICAL DATA
TOTAL SERVICE STATION
9000 PENN AVE. SO., BLOOMINGTON, MN

PROJECT NO.	DATE	SCALE	PREPARED BY	REVIEWED BY	DATE	REVISION	
719-012	5/91	1" = 20'	EFW	JFS	7/91	ORIGINAL	J1

PL20220183



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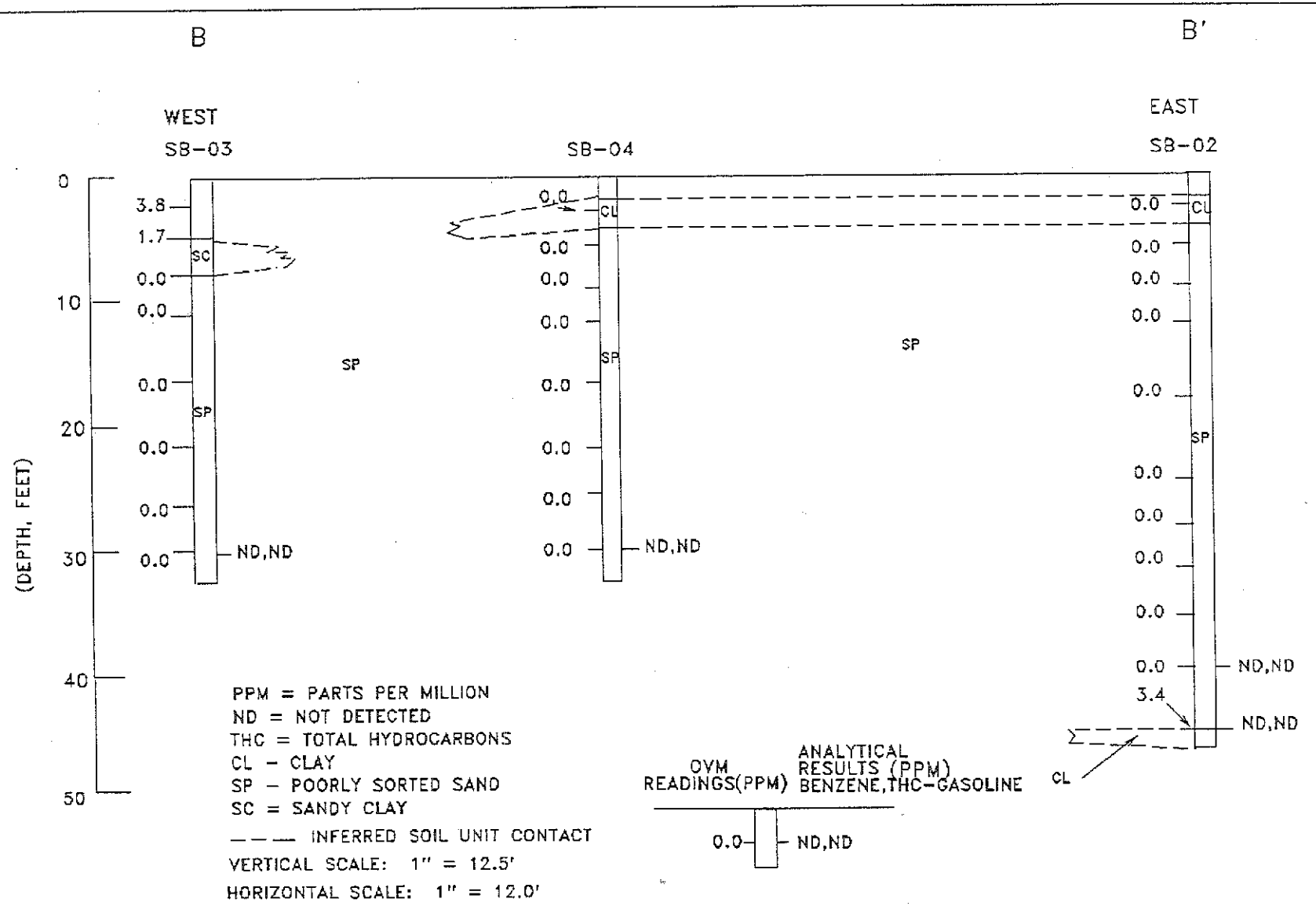
BLOOMINGTON, MINNESOTA

FIGURE 9
GEOLOGIC CROSS SECTION A-A' AND SOIL ANALYTICAL RESULTS
TOTAL SERVICE STATION
9000 PENN AVENUE SOUTH, BLOOMINGTON, MINNESOTA

PROJECT NO.	DATE	SCALE	PREPARED BY	REVIEWED BY	DATE	REVISION	
719-012	5/91	SEE DRAWING	EFW			ORIGINAL	C3

PL20220183



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BLOOMINGTON, MINNESOTA

FIGURE 10
GEOLOGIC CROSS SECTION B-B' AND SOIL ANALYTICAL RESULTS
TOTAL SERVICE STATION
9000 PENN AVENUE SOUTH, BLOOMINGTON, MN

PROJECT NO.	DATE	SCALE	PREPARED BY	REVIEWED BY	DATE	REVISION	
719-012	6/91	SEE DRAWING	SHW REV: EFW	JFS	7/91	ORIGINAL	C2

PL20220183

TABLES

TABLE 1
SOIL SAMPLE VAPOR ORGANIC DATA
TOTAL PETROLEUM SERVICE STATION
9000 PENN AVENUE SOUTH
BLOOMINGTON, MN

DEPTH (FEET)

BORING #	2.5-4.5	5-7	7.5-9.5	10-12	15-17	20-22	25-27	30-32	35-37	40-42	45-47
SB-01	0	0	0	87	0	1.2	1.7	0	---	---	---
SB-02	0	0	0	0	0	0	0	0	0	0	3.4
SB-03	3.8	1.7	0	0	0	0	0	0	---	---	---
SB-04	0	0	0	0	0	0	0	0	---	---	---

ALL DATA SHOWN IN PARTS PER MILLION (PPM).
---- NO READINGS RECORDED. END OF BORING AT 32 FEET BELOW GROUND SURFACE (BGS)

TABLE 2
SOIL ANALYTICAL DATA
TOTAL PETROLEUM SERVICE STATION
9000 PENN AVENUE SOUTH
BLOOMINGTON, MN

HOLE SAMPLE #	SAMPLE DATE	BENZENE	TOLUENE	ETHYL BENZENE	XYLENE	THC GASOLINE	LEAD	MTBE
SB-01-10	2/28/91	<0.06	<0.11	<0.05	0.35	2.0	9	<0.06
SB-01-30	2/28/91	<0.06	<0.11	<0.05	<0.28	<1.2	1.3	<0.06
SB-02-40	2/28/91	<0.06	<0.11	<0.05	<0.28	<1.2	<1.3	<0.06
SB-02-45	2/28/91	<0.06	<0.11	<0.05	<0.28	<1.2	3	<0.06
SB-03-30	2/28/91	<0.06	<0.11	<0.05	<0.28	<1.2	2	<0.06
SB-04-30	2/28/91	<0.06	<0.11	<0.05	<0.28	<1.2	1.3	<0.06

LABORATORY REPORT SHOWS SPECIFIC DETECTION LIMITS USED IN EACH ANALYSIS.
ALL VALUES ARE IN PARTS PER MILLION (PPM.)
SAMPLE DEPTHS ARE IN FEET BELOW GROUND SURFACE (BGS.)
THC - TOTAL HYDROCARBONS. MTBE - METHYL TERTIARY BUTYL ETHERS.

APPENDIX C
SOIL BORING LOGS

FILING CODE - 19012S1A

SOIL BORING LOG

ENECOTECH, INC.

PROJECT NAME - TOTAL-PENN
PROJECT NUMBER - 719-012
CLIENT - TOTAL
LOCATION - 9000 PENN AVENUE SO.

DRILLING CONTRACTOR - THEIN
DRILLER - MIKE
SURFACE ELEVATION -
DRILLING METHOD - HSA

HOLE DESIGNATION - SB-01
DATE STARTED - 2/28/91
DATE COMPLETED - 2/28/91
ENECOTECH SUPERVISOR - SPY

DEPTH FROM	DEPTH TO	SAMPLE NUMBER	SAMPLING METHOD	PENETRATION RECORD SPLIT SPOON BLOWS 6"	6"	6"	6"	PERCENT RECOVERY	OVM VALUE	ODOR STRENGTH	ASTM SYMBOL	SAMPLE DESCRIPTION (COMPONENTS, COLOR, MOISTURE, NATIVE/FILL)	NOTES (STRUCTURES, DRILLER'S COMMENTS, GEOLOGIC CLASSIFICATION)
0	2.5		AF								SP	MEDIUM SAND, MIXED WITH GRAVEL, BROWN	
2.5	4.5		SS				32	30	0		SP	SAA, FROZEN	HAMMERING THROUGH FROST
4.5	5.0		AF								SP	SAA	
5.0	7.0		SS				8	90	0		SP	MEDIUM SAND, LIGHT BROWN	
7.0	7.5		AF								SP	SAA	
7.5	9.5		SS				7	90	0		SP	SAA	
9.5	10.0		AF								SP	SAA	
10.0	12.0	SB-01-10	SS				7	90	87		SP	SAA	MODERATE HYDROCARBON ODOR
12.0	15.0		AF								SP	SAA	
15.0	17.0		SS				20	100	0		SP	MEDIUM SAND, BROWN TO BLACK	NO HYDROCARBON ODOR
17.0	20.0		AF								SP	MEDIUM SAND, BROWN	
20.0	22.0		SS				40	100	1.2		SP	MEDIUM SAND WITH 1/8" BEDS OF PEAT THROUGHOUT SPOON	
22.0	25.0		AF								SP	SAA	

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FILING CODE - 19012S1B

SOIL BORING LOG

ENECOTECH, INC.

PROJECT NAME - TOTAL-PENN
PROJECT NUMBER - 719-D12
CLIENT - TOTAL
LOCATION - 9000 PENN AVENUE SO.

DRILLING CONTRACTOR - THEIN
DRILLER - MIKE
SURFACE ELEVATION -
DRILLING METHOD - HSA

HOLE DESIGNATION - SB-D1
DATE STARTED - 2/28/91
DATE COMPLETED - 2/28/91
ENECOTECH SUPERVISOR - SPY

DEPTH FROM	DEPTH TO	SAMPLE NUMBER	SAMPLE METHOD	PENETRATION RECORD SPLIT SPOON BLOWS 6"	6"	6"	6"	PERCENT RECOVERY	OVM VALUE	ODOR STRENGTH	ASTM SYMBOL	SAMPLE DESCRIPTION (COMPONENTS, COLOR, MOISTURE, NATIVE/FILL)	NOTES (STRUCTURES, DRILLER'S COMMENTS, GEOLOGIC CLASSIFICATION)
25	27		SS				45	1D0	1.7		SP	MEDIUM SAND WITH GRAVEL, LIGHT BROWN	
27	3D		AF								SP	FINE TO MEDIUM SAND, DARK BROWN	
3D	32	SB-D1-3D	SS				44		D		SP	MEDIUM SAND, LIGHT BROWN	

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FILING CODE - 19012S2A

SOIL BORING LOG

ENECOTECH, INC.

PROJECT NAME - TOTAL-PENN
PROJECT NUMBER - 719-012
CLIENT - TOTAL
LOCATION - 9DOD PENN AVENUE SO.

DRILLING CONTRACTOR - THEIN
DRILLER - MIKE
SURFACE ELEVATION -
DRILLING METHOD - HSA

HOLE DESIGNATION - SB-02
DATE STARTED - 2/28/91
DATE COMPLETED - 2/28/91
ENECOTECH SUPERVISOR - SPY

DEPTH FROM	DEPTH TO	SAMPLE NUMBER	SAMPLING METHOD	PENETRATION RECORD SPLIT SPOON BLOWS 6"	6"	6"	6"	PERCENT RECOVERY	OVM VALUE	ODOR STRENGTH	ASTM SYMBOL	SAMPLE DESCRIPTION (COMPONENTS, COLOR, MOISTURE, NATIVE/FILL)	NOTES (STRUCTURES, DRILLER'S COMMENTS, GEOLOGIC CLASSIFICATION)
D	2.5		AF								SP	MEDIUM SAND, LIGHT BROWN	
2.5	4.5		SS					100	D		CL	SANDY CLAY, LIGHT GREEN BROWN	POUNDING THROUGH FROST
4.5	5		AF								SC	SAA	
5	7		SS				7	6D	D		SP	MEDIUM SAND, LIGHT BROWN	
7	7.5		AF								SP	SAA	
7.5	9.5		SS				9	1DD	D		SP	SAA	
9.5	10		AF								SP	SAA	
10	12		SS				10	1DD	0		SP	SAA	
12	15		AF								SP	SAA	
15	17		SS				15	1DD	D		SP	MEDIUM SAND, LT BROWN TO BLACK	
17	2D		AF								SP	MEDIUM SAND, DARK BROWN	
20	22		SS				11	1DD	D		SP	MED SAND, LIGHT BROWN TO BLACK	
22	25		AF								SP	MEDIUM SAND, DARK BROWN	

FILING CODE - 19012S2B

SOIL BORING LOG

ENECOTECH, INC.

PROJECT NAME - TOTAL-PENN
PROJECT NUMBER - 719-012
CLIENT - TOTAL
LOCATION - 9000 PENN AVENUE SO.

DRILLING CONTRACTOR - THEIN
DRILLER - MIKE
SURFACE ELEVATION -
DRILLING METHOD - HSA

HOLE DESIGNATION - SB-02
DATE STARTED - 2/28/91
DATE COMPLETED - 2/28/91
ENECOTECH SUPERVISOR - SPY

DEPTH FROM	DEPTH TO	SAMPLE NUMBER	SAMPLE METHOD	PENETRATION RECORD SPLIT SPOON BLOWS 6"	6"	6"	6"	PERCENT RECOVERY	OVM VALUE	ODOR STRENGTH	ASTM SYMBOL	SAMPLE DESCRIPTION (COMPONENTS, COLOR, MOISTURE, NATIVE/FILL)	NOTES (STRUCTURES, DRILLER'S COMMENTS, GEOLOGIC CLASSIFICATION)
25	27		SS				52	100	0		SP	MEDIUM SAND, LIGHT BROWN TO ORANGE/BROWN	
27	30		AF								SP	SAA, DARK BROWN	
30	32		SS				80	30	0		SP	MEDIUM TO COARSE SAND, DARK BROWN TO ORANGE/BROWN	
32	35		AF								SP	SAA	
35	37		SS				34	100	0		SP	MEDIUM TO FINE SAND, LIGHT BROWN	
37	40		AF								SP	SAA	
40	42	SB-02-40	SS				40	50	0		SP	FINE SAND, GREEN, SATURATED	WATER @ ~ 40'
42	45		AF								SP	SAA	ENCOUNTERED ~ 6" ROCK LAYER @ 43'
45	47	SB-02-45	SS				50	100	3.4		SP	45-46'- MEDIUM SAND, GRAY, SATURATED	
											CL	46-46.5'-STIFF SILTY CLAY, GRAY	
											CL	46.5-47.5'-SANDY CLAY, GRAY	
												TERMINATED BORING @ 47.0'	

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FILING CODE - 19012S3A

SOIL BORING LOG

ENECOTECH, INC.

PROJECT NAME - TOTAL-PENN
PROJECT NUMBER - 719-012
CLIENT - TOTAL
LOCATION - 9000 PENN AVENUE SO.

DRILLING CONTRACTOR - THEIN
DRILLER - MIKE
SURFACE ELEVATION -
DRILLING METHOD - HSA

HOLE DESIGNATION - SB-03
DATE STARTED - 2/28/91
DATE COMPLETED - 2/28/91
ENECOTECH SUPERVISOR - SPY

DEPTH FROM	DEPTH TO	SAMPLE NUMBER	SAMPLE METHOD	PENETRATION RECORD SPLIT SPOON BLOWS 6"	6"	6"	6"	PERCENT RECOVERY	OVM VALUE	ODOR STRENGTH	ASTM SYMBOL	SAMPLE DESCRIPTION (COMPONENTS, COLOR, MOISTURE, NATIVE/FILL)	NOTES (STRUCTURES, DRILLER'S COMMENTS, GEOLOGIC CLASSIFICATION)
0	2.5		AF								SP	MEDIUM SAND, LIGHT BROWN	
2.5	4.5		SS						3.8		SP	SAA	POUNDING THROUGH FROST
4.5	5		AF								SP	SAA	
5	7		SS				8	50	1.7		SC	MEDIUM SAND W/ CLAY, LIGHT BROWN	
7	7.5		AF								SC	SAA	
7.5	9.5		SS				14	75	0		SP	MEDIUM SAND W/GRAVEL, LIGHT BROWN	
9.5	10		AF								SP	SAA	
10	12		SS				7	90	0		SP	MEDIUM SAND W/GRAVEL, LIGHT BROWN	
12	15		AF								SP	SAA	
15	17		SS				18	90	0		SP	MED SAND, LT BROWN TO BLACK	
17	20		AF								SP	MEDIUM SAND, LIGHT BROWN	
20	22		SS				18	60	0		SP	SAA - BOTTOM 1/2" ON SPOON CONTAINED PEAT	
22	25		AF								SP	MEDIUM SAND, LIGHT BROWN	

FILING CODE - 19012S38

SOIL BORING LOG

ENECOTECH, INC.

PROJECT NAME - TOTAL-PENN
PROJECT NUMBER - 719-012
CLIENT - TOTAL
LOCATION - 9000 PENN AVENUE SO.

DRILLING CONTRACTOR - THEIN
DRILLER - MIKE
SURFACE ELEVATION -
DRILLING METHOD - HSA

HOLE DESIGNATION - SB-03
DATE STARTED - 2/28/91
DATE COMPLETED - 2/28/91
ENECOTECH SUPERVISOR - SPY

DEPTH FROM	DEPTH TO	SAMPLE NUMBER	SAMPLE METHOD	PENETRATION RECORD SPLIT SPOON BLOWS 6"	6"	6"	6"	PERCENT RECOVERY	DVM VALUE	ODOR STRENGTH	ASTM SYMBOL	SAMPLE DESCRIPTION (COMPONENTS, COLOR, MOISTURE, NATIVE/FILL)	NOTES (STRUCTURES, DRILLER'S COMMENTS, GEOLOGIC CLASSIFICATION)
25	27						35	90	0		SP	MEDIUM SAND W/GRAVEL, LIGHT BROWN	
27	30		AF								SP	SAA	
30	32	SB-03-30	SS				23		0		SP	COARSE SAND, BROWN	

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FILE CODE - 19D12S4A

SOIL BORING LOG

ENECOTECH, INC.

PROJECT NAME - TOTAL-PENN
PROJECT NUMBER - 719-D12
CLIENT - TOTAL
LOCATION - 9DDD PENN AVENUE SO.

DRILLING CONTRACTOR - THEIN
DRILLER - MIKE
SURFACE ELEVATION -
DRILLING METHOD - HSA

HOLE DESIGNATION - SB-04
DATE STARTED - 2/28/91
DATE COMPLETED - 2/28/91
ENECOTECH SUPERVISOR - SPY

DEPTH FROM	DEPTH TO	SAMPLE NUMBER	SAMPLE METHOD	PENETRATION RECORD SPLIT SPOON BLOWS 6"	6"	6"	6"	PERCENT RECOVERY	OVM VALUE	ODOR STRENGTH	ASTM SYMBOL	SAMPLE DESCRIPTION (COMPONENTS, COLOR, MOISTURE, NATIVE/FILL)	NOTES (STRUCTURES, DRILLER'S COMMENTS, GEOLOGIC CLASSIFICATION)
0	2.5		AF								SP	MEDIUM SAND, LIGHT BROWN	
2.5	4.5		SS					1DO	0		CL	SANDY, SILTY CLAY, LIGHT BROWN	
4.5	5		AF								SP	MEDIUM SAND, LIGHT BROWN	
5	7		SS					75	D		SP	MEDIUM SAND, LIGHT BROWN	
7	7.5		AF								SP	SAA	
7.5	9.5		SS					90	D		SP	SAA	
9.5	10		AF								SP	SAA	
10	12		SS					90	D		SP	SAA	
12	15		AF								SP	SAA	
15	17		SS					90	D		SP	SAA	
17	20		AF								SP	SAA	
20	22		SS					90	0		SP	SAA W/1/2" LAYER OF PEAT @ ~ 21.5'	
22	25		AF								SP	MEDIUM SAND, DARK BROWN	

FILE CODE - 19012S4B

SOIL BORING LOG

ENECOTECH, INC.

SHEET NO. 2 OF 2

PROJECT NAME - TOTAL-PENN
PROJECT NUMBER - 719-012
CLIENT - TOTAL
LOCATION - 9000 PENN AVENUE SO.

DRILLING CONTRACTOR - THEIN
DRILLER - MIKE
SURFACE ELEVATION -
DRILLING METHOD - HSA

HOLE DESIGNATION - SB-04
DATE STARTED - 2/28/91
DATE COMPLETED - 2/28/91
ENECOTECH SUPERVISOR - SPY

DEPTH FROM	DEPTH TO	SAMPLE NUMBER	SAMPLING METHOD	PENETRATION RECORD SPLIT SPOON BLOWS 6"	6"	6"	6"	PERCENT RECOVERY	DVM VALUE	ODOR STRENGTH	ASTM SYMBOL	SAMPLE DESCRIPTION (COMPONENTS, COLOR, MOISTURE, NATIVE/FILL)	NOTES (STRUCTURES, DRILLER'S COMMENTS, GEOLOGIC CLASSIFICATION)
25	27		SS					100	0		SP	MEDIUM SAND, LIGHT BROWN	
27	30		AF								SP	SAA	
30	32	SB-04-30	SS					100	0		SP	COARSE SAND MIXED W/GRAVEL, BROWN	

PL20220183

Minnesota Pollution Control Agency
520 Lafayette Road North | St. Paul, Minnesota 55155-4194 | 651-296-6300
800-657-3864 | 651-282-5332 TTY | www.pca.state.mn.us | Equal Opportunity Employer

December 16, 2011

I - TANK REMOVAL LETTER

Mr. Ned Abdul
Bloomington Investments, LLC
510 1st Avenue North, Suite 200
Minneapolis, MN 55403

RE: August 4, 2011, Underground Storage Tank Field Citation - Completion of Corrective Action for Minnesota Pollution Control Agency Tank Site No. 2635 – 9000 Penn Avenue South, Bloomington, Minnesota

Dear Mr. Abdul:

This letter acknowledges that Bloomington Investments, LLC (Regulated Party) has completed the corrective action described in the Minnesota Pollution Control Agency's (MPCA) August 4, 2011, Underground Storage Tank Field Citation by removing the tanks from the ground. The MPCA also acknowledges receipt of the Regulated Party's check in the amount of $750 received on September 22, 2011.

On December 8, 2011, the Regulated Party's MPCA certified tank contractor removed the three underground storage tanks from the ground at 9000 Penn Avenue South, Bloomington, Minnesota. MPCA staff was present during the removal of the tanks. Based upon this information, the MPCA staff has determined that the corrective action contained in the Field Citation has been completed.

If you have any questions, please contact me at 651-285-8666.

Thank you for your attention to this matter and your cooperation in fulfillment of the requirements.

Sincerely,

Bob Dullinger for

Shirley Smith
Pollution Control Specialist Senior
Compliance and Enforcement Section
Industrial Division

SJS:map

cc: Michael Wilson, Hennepin County Department of Environmental Services
Carmen Netten, Attorney General's Office
Bob Dullinger, MPCA
Nate Blasing, MPCA
MPCA Enforcement Data Coordinator-Enforcement Database Tracking Number #13134
Shirley Smith, MPCA
MPCA Tank Site No. 2635 File